

PILOT STUDY FOR
PRE- AND POST- HURRICANE MITIGATION
AND DEVELOPMENT FOR FERNANDINA BEACH



Northeast Florida Regional Planning Council

Baker • Clay • Duval • Flagler • Nassau • Putnam • St. Johns

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PRE- AND POST- HURRICANE MITIGATION
AND DEVELOPMENT FOR FERNANDINA BEACH

Prepared
By

NORTHEAST FLORIDA REGIONAL
PLANNING COUNCIL

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EXECUTIVE SUMMARY

The Pilot Study for Pre- And Post- Hurricane Mitigation And Development for Fernandina Beach was conducted and completed by the Northeast Florida Regional Planning Council under a contract with the Department of Community Affairs. The scope of work identified in the contract set the outline for the completion of the work product study. The purpose of this study is to provide recommendations, funding options, and an implementation schedule for pre- and post-storm mitigation (nonstructural and structural), and redevelopment measures that can be presented for adoption by the City of Fernandina Beach.

The City of Fernandina Beach is located on the northern portion of Amelia Island, the northern most barrier island in Florida. Amelia Island is the southern most component of the geomorphic area known as the Sea Islands, which stretch from South Carolina to northern Florida.

The City of Fernandina Beach has had very little experience dealing with the impacts of a major storm event. Due to the low incidence of major storms impacting the City, the majority of the residents have no direct experience with a hurricane type storm. Although some of the realities of the potential devastation associated with a hurricane were made clear with the coverage of both Hugo and Andrew, it still remains to be seen the extent to which the regulations the City has adopted addressing hurricane mitigation are adequate.

This study examined a number of types of pre and post mitigation techniques that a local government can utilize to minimize the adverse impacts of a hurricane. These techniques were then considered as to which would be most likely to be implemented by the City of Fernandina Beach given the community attitudes towards hurricane mitigation.

The mitigation measures identified for implementation by the City through this study are primarily measures that can be implemented prior to a storm which will hopefully reduce the impact of a major storm. These measures include dune enhancement and protection program, land use techniques such as a density bonus program for the coastal areas which will allow limited increased densities in turn for a property owner incorporating and implementing certain hazard mitigation techniques, and an education/awareness program.

The City of Fernandina Beach has taken no official or direct actions to adopt any of the mitigation measures proposed in this study. However, the City has requested and the Northeast Florida Regional Planning Council has committed to continue to work with the City to refine and improve the City's disaster mitigation and response plans and programs. City officials have voiced the desire to pursue pre-storm event measures which will limit the adverse impacts of a disaster. It is the belief of local officials that the implementation of pre-storm mitigation techniques will be more valuable in reducing the impacts of a disaster than post hurricane measures.

NORTHEAST FLORIDA REGIONAL PLANNING COUNCIL
PILOT STUDY FOR
PRE- AND POST-HURRICANE MITIGATION AND DEVELOPMENT
THE CITY OF FERNANDINA BEACH, FLORIDA

PURPOSE

The purpose of this study is to provide recommendations, funding options, and an implementation schedule for pre- and post-storm mitigation (nonstructural and structural), and redevelopment measures that can be presented for adoption by the governing body of the City of Fernandina Beach.

In order to provide a basis for recommendations concerning these activities, the study will examine the geographic parameters and the physical and social fabric of the community. It is anticipated that the various concepts that are to be explored in this study will form the foundation for action by the City of Fernandina Beach.

COMMUNITY ANALYSIS

Physical Characteristics:

The City of Fernandina Beach is located on the northern portion of the northernmost barrier island in Florida, known as Amelia Island and is shaped somewhat like a reversed letter "E". This location, just south of the Florida-Georgia border is shown on Map A, Location Map as is the shape of the city.

Amelia Island is the southernmost end of large geomorphic area known as the Sea Islands. This chain of barrier islands runs along the ocean front in the South Atlantic Coastal Zone as far north as into South Carolina. This string of barrier or beach/dune ridge islands protects a large expanse of tidal marshes located to their west rather than broad open lagoons.

These marshes are the result of a large amount of sediment carried into the tidal creeks by the upland rivers and are drained by tidal creeks flowing into the Intracoastal Waterway which in turn flows into the St. Marys and Nassau Rivers and then out to the ocean. The spatial relationships of these features are shown on Map B, entitled "Natural Resources". This map also emplaces the relationship of other natural features forest land, wetlands, and aquatic preserves.

The city portion of Amelia island is bounded by the St. Mary's River on the north, which has been jettied and dredged over the years and is now the main channel into the Kings Bay Submarine Base. The eastern verge is the Atlantic Shore at the ocean beach; to the south is the southern portion of the island consisting of subsiding dunes slowly falling away into the Nassau River; to the west is the Intracoastal Waterway which is really a

GEORGIA

MAP A

Location Map

Fernandina Beach

A-1-A

NASSAU
CO.

A-1-A

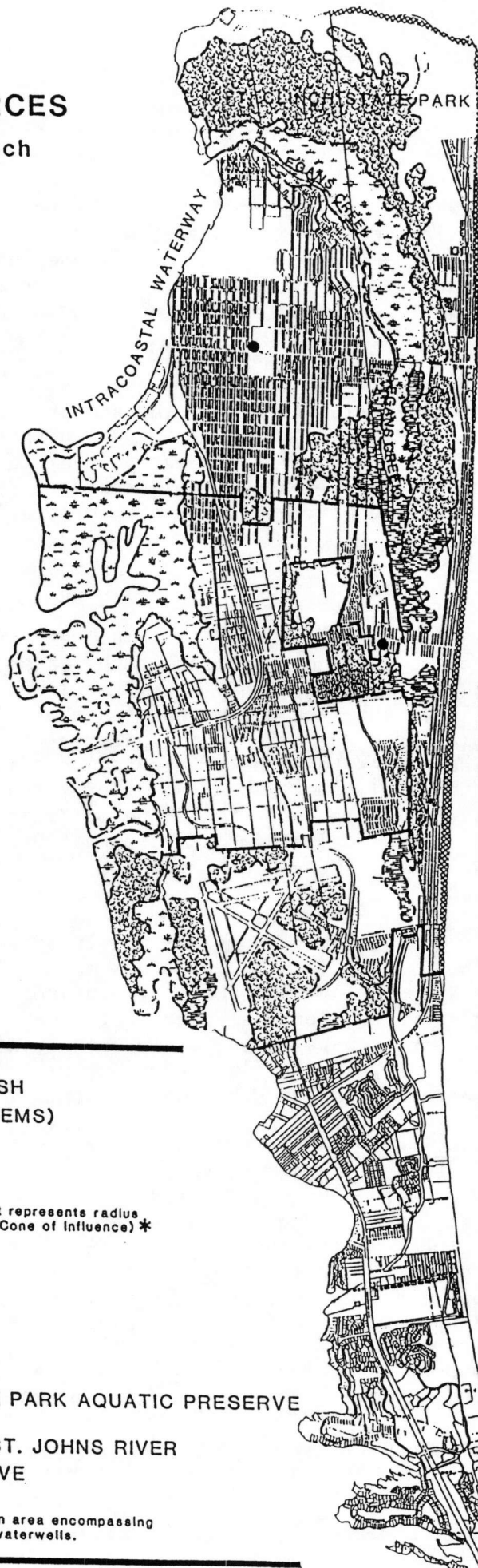
DUVAL CO.

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REGIONAL PLANNING COUNCIL








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NATURAL RESOURCES

City of Fernandina Beach

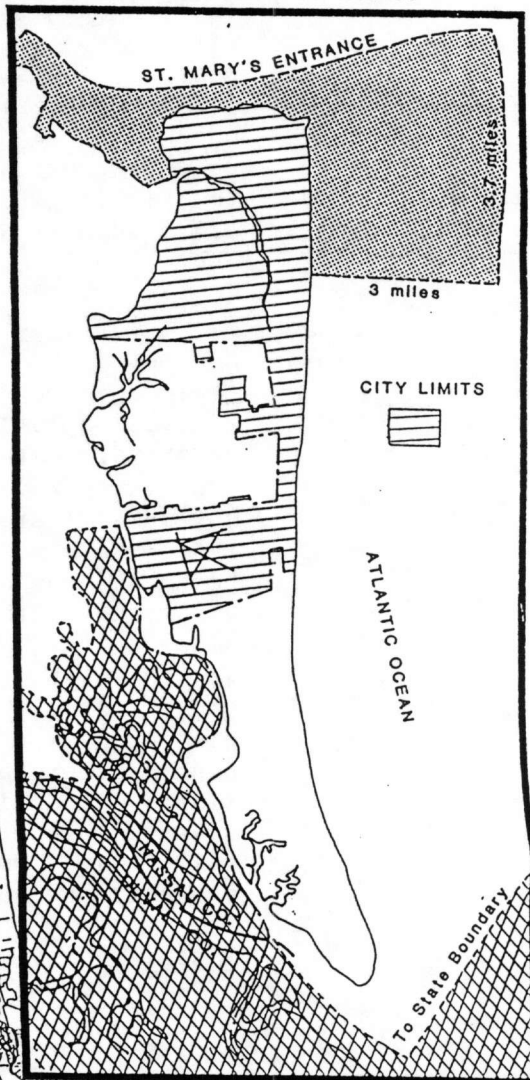


LEGEND

-  SALTWATER MARSH (ESTUARINE SYSTEMS)
-  WETLANDS
-  PUBLIC WELL (Dot represents radius of Cone of Influence) *
-  FORESTLAND
-  BEACH
-  FT. CLINCH STATE PARK AQUATIC PRESERVE
-  NASSAU RIVER / ST. JOHNS RIVER AQUATIC PRESERVE

* Cone of Influence is an area encompassing a 200' radius around waterwells.

AQUATIC PRESERVES INSET



tidal river that offers access to the marshes west of the island and is locally known as the Amelia River.

The island is composed of Pleistocene Era sediments that have been reworked from the ancient barrier island deposits. These fine sands have been merged with more recent Holocene sediments. Each of these sediments is easily relocated by hurricanes, northeastern and other major storms. Therefore, the shoreline is subject to meandering and moving due to sea conditions.

Soils characteristics and associations are reported on Map C, "Soils Associations". Four soil group associations are reported and are soils that are found on sand ridges and coastal dunes. All are based on various sands with differing characteristics and consist of nearly level to moderately steep, excessively drained to poorly drained soils that are sandy to a depth of 80 inches or more. Some of these soils are loamy below a depth of 40 inches.

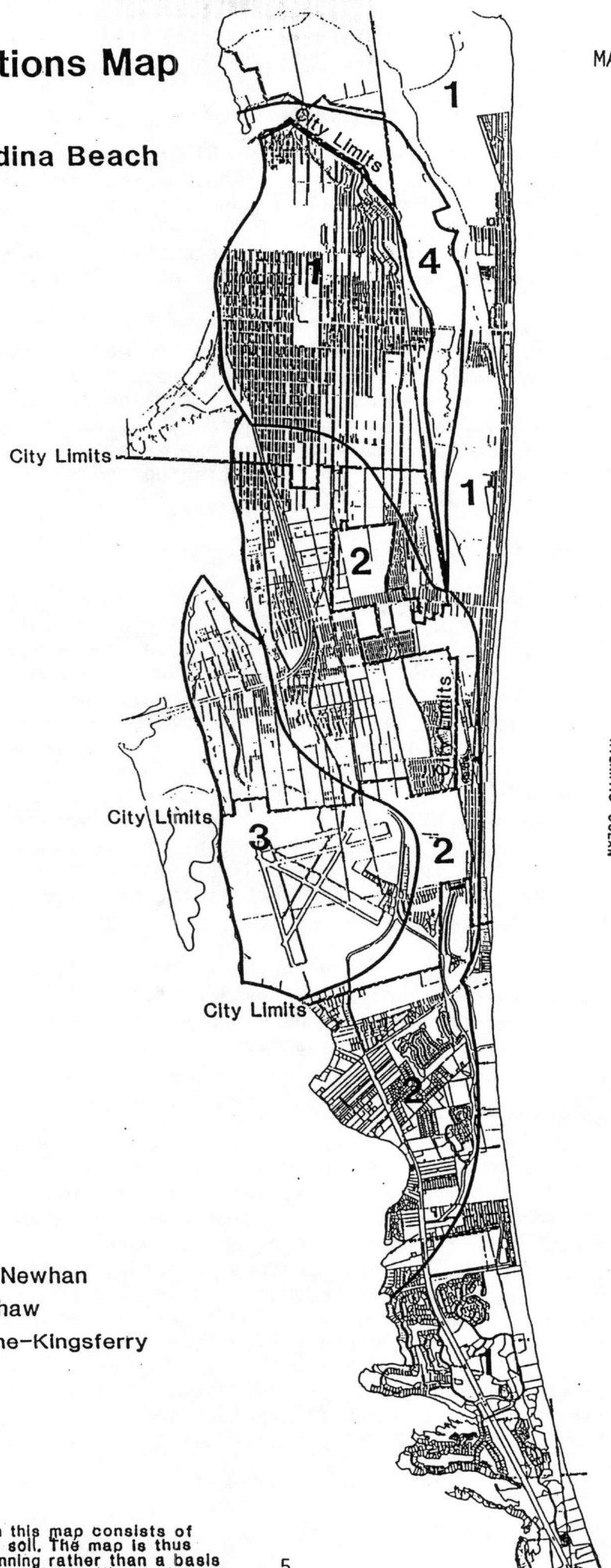
The four soil associations are as follows:

1. Kureb-Fripp-Newhan: nearly level to rolling, excessively drained sandy soils; in high positions on the landscape. These soils are on narrow, rolling, sandy dunelike ridges interspersed with narrow swales. they are elongated with their long axis generally oriented from north to south, parallel to the Atlantic Ocean coast. The ridges form the primary dunes adjacent to the ocean beach and the relic beach dunes farther inland. their height ranges from 4 to 35 feet; the slope is generally 8 to 100 feet in length. These soils are used for urban development and often support woodland. Many beach houses have been built along the Atlantic Ocean.
2. Mandarin-Echaw: nearly level, somewhat poorly drained and moderately drained soils; in high positions on the landscape. These soils are in slightly elevated flatwood areas. Natural vegetation is slash pine, longleaf pine, water oak and live oak. Understory plants are saw palmetto, fetterbush lyonia and pine land threeawn. These soils mostly support natural vegetation, but in some areas are used for urban development.
3. Leon-Boulogne-Kingsferry: nearly level, poorly drained and very poorly drained soils that are sandy throughout; in low positions on the landscape. These soils are on flatwoods interspersed with grassy ponds, drainage ways, and small grassy wet depressions. Natural vegetation on the flatwoods is longleaf pine and slash pine. Understory vegetation is saw palmetto, pineland threeawn and bluestem. Vegetation in the ponds, depressions, and drainageways consists of pond pine, cypress and sweetgum. The understory includes water-tolerant grasses. These soils mostly support natural vegetation. In cleared areas they are pastured, and in some areas are used for urban development.
4. Tisonia: level and nearly level, very poorly drained, saline, organic soils; in low positions on the landscape. These soils

Soil Associations Map

MAP C

City of Fernandina Beach



Legend

- 1 Kureb-Fripp-Newhan
- 2 Mandarin-Echaw
- 3 Leon-Boulogne-Kingsferry
- 4 Tisonia

Note:

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

are in tidal marshes along the St. Marys River, the Nassau River, Egans Creek and the Intracoastal Waterway. Tidal marshes are saline in most places but are brackish where small feeder streams enter and are flooded daily. Natural vegetation consists of needlegrass rush and sand cordgrass. These soils support natural vegetation and are usually used as spawning areas for many commercially important finfish and shellfish.

The primary attraction of the city and this island is the Atlantic Ocean, often for tourist purposes. However, there are many commercial and industrial values to a location in a city with an ocean port or a site nearby on the mainland. A first locational value is for the coastal or international shipment of high bulk low value-added goods manufactured here and concurrent with that may be the importation of raw materials. A second is the use of the Fernandina Port by the local fishing and shrimping fleet.

Unique Physical Features:

The older and commercial parts of the City of Fernandina Beach lie on the western or highest portion of Amelia Island. Land at the eastern (Atlantic) beach is characterized by a low dune system and a sandy and sparsely vegetated plain, the topographic relief in the western part of the City consists of a series of old dunes running roughly parallel to the coast at about 30 to 40 feet in height. The high spots are McClure Hill at 56 feet and the Amelia Island Lighthouse which is slightly over 60 feet in elevation.

To the west of the shoreline dunes is a low lying marshy or swampy swale running north-south that is drained by Egans Creek, which runs to the north down its center and enters the Amelia River just south of its intersection with the St. Mary's River. Egans Creek is the principal natural drainage feature serving the city.

Further west this swale gives way to the system of old relic higher dunes supporting the commercial and older portion of the City of Fernandina Beach. The most intense land use development is located in the northerly central western part of Amelia Island.

Present State:

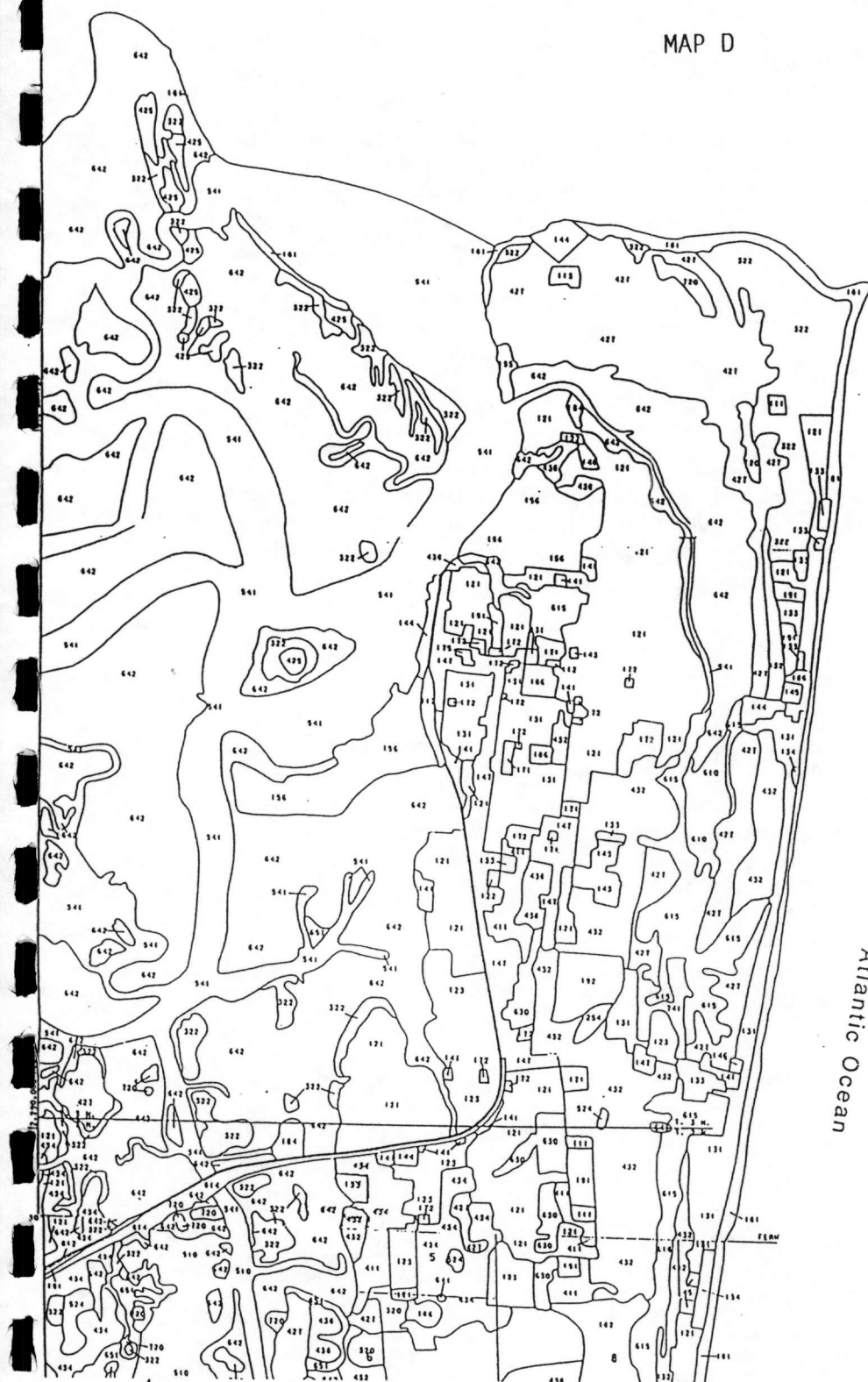
At present, the City of Fernandina Beach contains about six miles of beachfront predominantly residential in character. Developed properties are primarily located in a narrow strip between the beach and Fletcher Avenue, a north-south road paralleling and between the beach and the Egans Creek swale system. Beachfront development has been mostly single family, however there are condominiums and duplexes in this beachfront belt near the southern boundary of the City. Additional development has also been occurring west of Fletcher Avenue toward Egans Creek.

A map classifying present land use and vegetation of the City and surrounding lands is shown on Map D. this map is based on a Florida Department of Transportation aerial survey and interpretation study conducted in 1987.

Land Use & Vegetation Classification

MAP D

FERNANDINA BEACH, FLORIDA



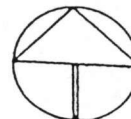
Atlantic Ocean

- 100 URBAN AND BUILT-UP
 - 110 RESIDENTIAL - LOW DENSITY
 - 111 SINGLE FAMILY UNITS
 - 112 MOBILE HOME UNITS
 - 120 RESIDENTIAL - MED. DENSITY
 - 121 SINGLE FAMILY UNIT
 - 122 MOBILE HOME UNITS
 - 123 RESIDENTIAL - MED. DENS.. MIXED
 - 130 RESIDENTIAL - HIGH DENSITY
 - 131 SINGLE FAMILY UNIT
 - 133 MULT. DWELLING UNITS. LOW RISE
 - 134 MULT. DWELLING UNITS. HI RISE
 - 140 COMMERCIAL AND SERVICES
 - 141 RETAIL SALES AND SERVICES
 - 143 PROF. SERVICES-OFFICE COMPLEXS
 - 144 CULTURAL AND ENTERTAINMENT
 - 145 TOURIST SERVICES
 - 147 MIXED COMMERCIAL & SERVICE
 - 170 INSTITUTIONAL
 - 175 GOVERNMENTAL
 - 180 RECREATIONAL
 - 181 SWIMMING BEACH
 - 182 GOLF COURSES
 - 186 COMMUNITY REC. FACILITIES
 - 190 OPEN LAND
 - 191 UNDEV. LAND WITHIN URBAN AREAS
- 300 RANGELAND < 10% TREE CR.
 - 320 SHRUB AND BRUSHLAND
 - 320 SHRUB AND BRUSHLAND
 - 322 COASTAL SHRUB
- 400 FORESTLAND
 - 410 CONIFEROUS FORESTS
 - 411 PINE FLATWOODS
 - 420 HARDWOOD FOREST
 - 427 UPL AND TEMPERATE HAMMOCK
 - 430 HARDWOOD FOREST (CONT.)
 - 432 SAND LIVE OAK
 - 434 HARDWOOD/CONIFER MIXED
 - 438 MIXED HARDWOOD
 - 440 TREE PLANTATIONS
 - 441 CONIFEROUS
- 500 WATER
 - 510 STREAMS AND WATERWAYS
 - 510 STREAMS AND WATERWAYS
 - 520 LAKES
 - 524 LAKES < 10 ACRES W/DOM. FEAT.
- 600 WETLANDS
 - 610 HARDWOOD FOREST
 - 610 HARDWOOD FOREST
 - 615 RIVER AND LAKE SWAMP
 - 630 FORESTED-MIXED
 - 630 FORESTED-MIXED
 - 640 VEGETATED NON-FORESTED
 - 641 FRESHWATER MARSH
 - 642 SALTWATER MARSH
 - 650 NON VEGETATED
 - 651 TIDAL FLATS
- 700 BARREN LAND
 - 710 BEACHES OTHER THAN SWIMMING
 - 710 BEACHES OTHER THAN SWIMMING
 - 720 SAND OTHER THAN BEACHES
 - 720 SAND OTHER THAN BEACHES
 - 740 DISTURBED LANDS
 - 741 RURAL LAND W/OUT INTENDED ACT.
- 800 TRANSPORTATION, COMM. & UTIL.
 - 810 TRANSPORTATION
 - 811 AIRPORTS
 - 812 RAILROADS
 - 814 MAJOR HIGHWAYS
 - 830 UTILITIES
 - 834 SEWAGE TREATMENT

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER
1000 500 0 1000 METERS



With the exception of the Airport and several large platted properties the rest of the City is improved with older residential and commercial development ranging from single family homes to two and three story multi-family and commercial buildings. Density is about 887 persons per square mile.

Open areas include several port and supporting storage and rail facilities along the Amelia River, the Fort Clinch State Park, the airport and its industrial park.

Topography:

Topography of the City has been generally discussed, however it is instructive to review the subject. The old city is on the highest portion of the northern part of the island as noted. From there the island becomes a ripple of old dune ridges running north-south ranging from a high of about 25 feet to a low of 5 feet.

Current Land Use:

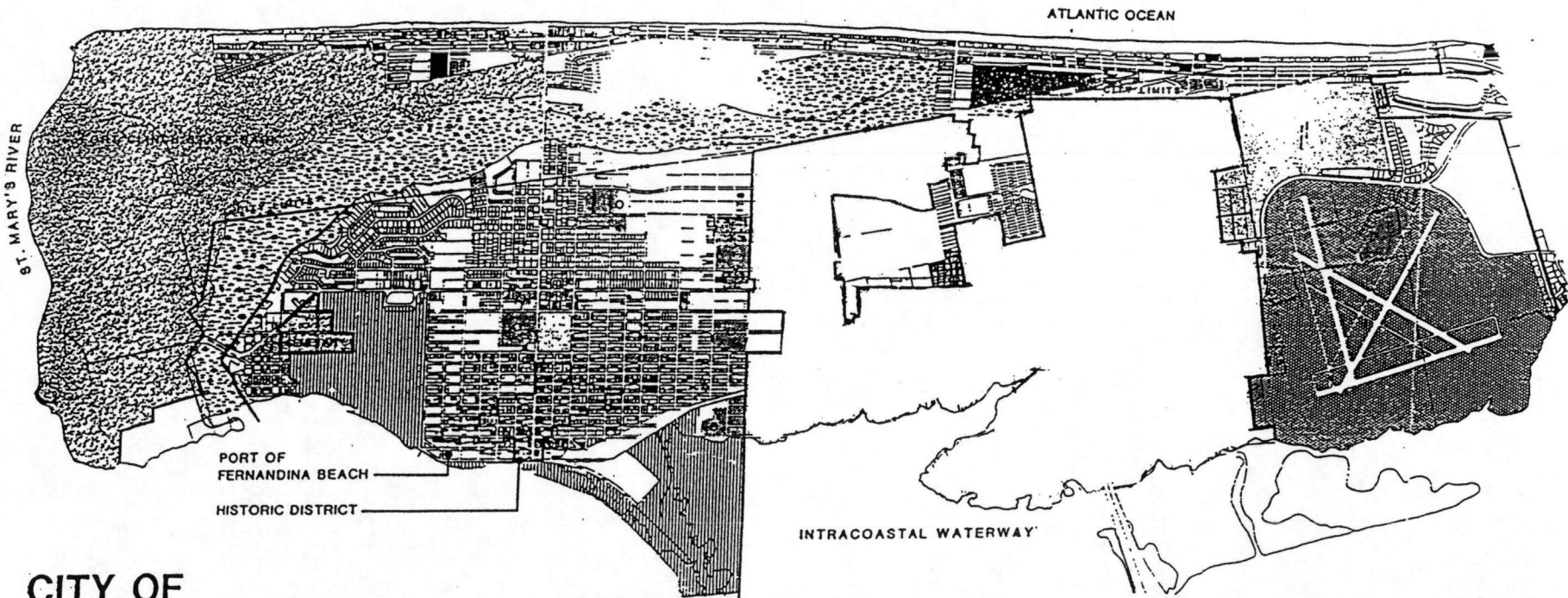
The City of Fernandina Beach contains about 6,278 acres as reported in the FDOT Land Use Inventory, dated 1987. Developed lands, excluding recreation, consist of about 2,354 acres or about 38 percent of the total city acreage. Map E, Existing Land Use 1990, from the adopted comprehensive plan details the spatial relationship of present development. Land use distribution and acreage is given in following Table A.

Table A
City of Fernandina Beach
EXISTING LAND USE INVENTORY, 1987

Land Cover	Acres	Percent Distribution
Residential	769	12.2%
Commercial/Services	74	1.2
Industrial	1,381	22.0
Institutional	130	2.1
Recreational	1,747	27.8
Open/Undeveloped	1,598	25.5
Right of Way	531	8.5
Undetermined	48	0.1
Total Acreage;	6,278	100.0%

Source: City of Fernandina Beach Comprehensive Plan-2005,
Florida Department of Transportation

The shape of the city has been dictated by the annexation of properties as they were developed and the owners desired to use city water and sewer

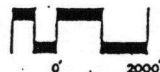


CITY OF FERNANDINA BEACH, FLORIDA

EXISTING LAND USE 1990



April 24, 1990



- Single Family
- Multi-Family
- Commercial
- Airport Industrial
- Utilities
- Industry

- Recreation
- Parks/Open Space
- Conservation/Wetlands
- Vacant
- Mobile Home

- Public Buildings
- SCHOOL
- HOSPITAL
- POLICE STATION
- WATERWELL PLANT
- FIRE STATION
- POST OFFICE
- CITY HALL
- COUNTY COURTHOUSE ANNEX
- COUNTY COURTHOUSE
- LIGHT HOUSE
- LIBRARY
- SEWER PLANT

services. This has caused the city to evolve into a shape reminiscent of a reversed letter "E", anchored at the top by the Fort Clinch State Park, the main commercial and older residential areas and on the south by the airport and related industrial land development.

Developed areas that lie in the central area of the "E" are appropriate for annexation, but wait upon a request for action by each individual property owner. Over time, needs for centralized water and sewer services should cause this area to be annexed into the City of Fernandina Beach.

Future Land Use:

Future land use in the City of Fernandina Beach is predicated on population growth spurring residential development of an estimated 2,259 housing units from 1987 to 2005 on an additional 422 previously acres. To support this housing another 41 acres of commercial improvements will be required. the supporting data has been compiled in Table B.

Table B
City of Fernandina Beach
FUTURE LAND USE REQUIREMENTS, 2005

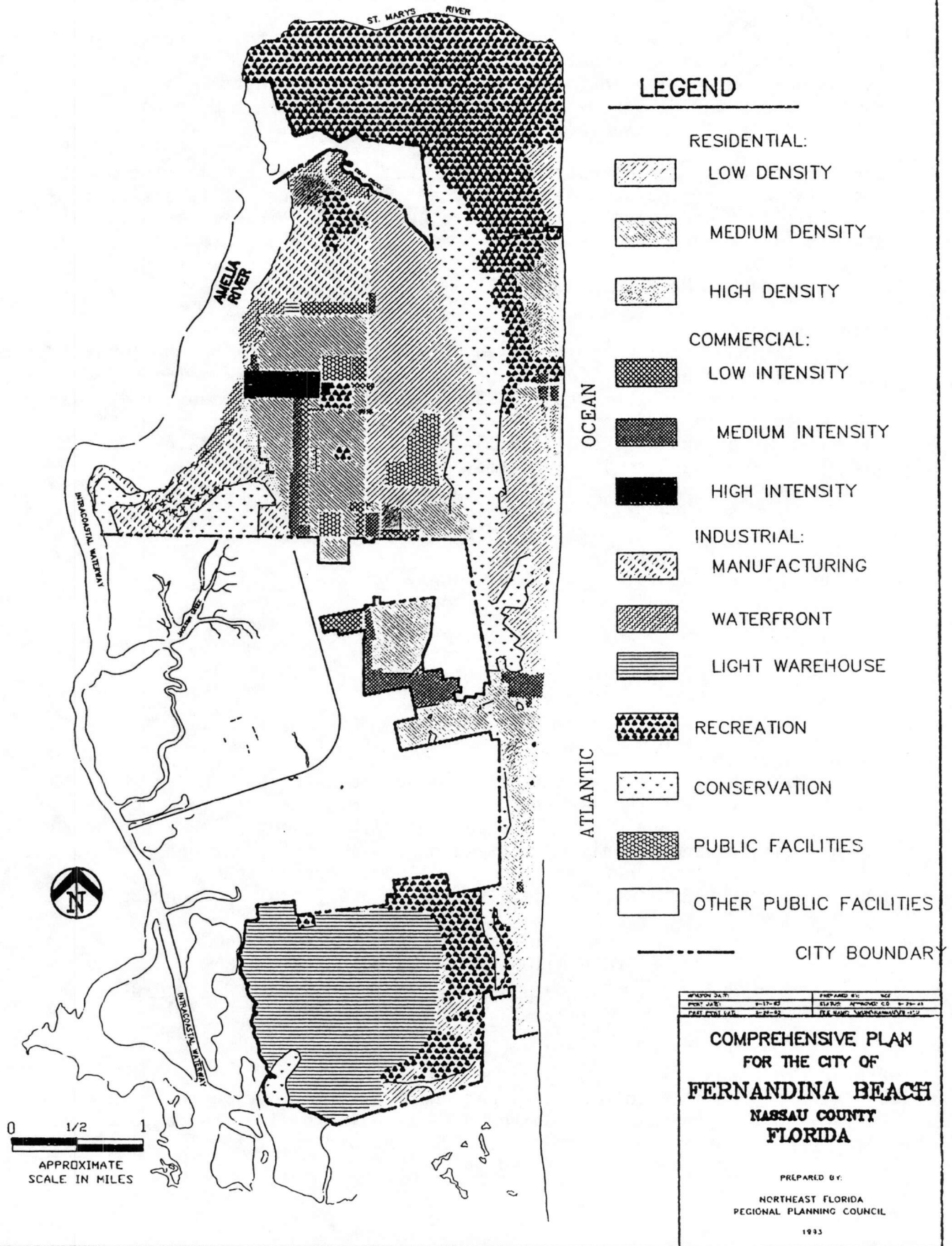
Land Cover	1987 Acres	2005 acres	2005 Percent Distribution
Residential	769	1,191	19.0%
Commercial/Services	73	114	1.8
Industrial	1,380	1,381	22.0
Institutional	130	130	2.1
Recreational	1,747	1,747	27.8
Open/Undeveloped	1,597	1,055	16.8
Right of Way	530	612	9.7
Undetermined	48	48	0.1
Total Acreage;	6,278	6,278	100.0%

Source: City of Fernandina Beach Comprehensive Plan-2005,
Florida Department of Transportation

No mention has been made of expanding the size of the city through annexation, however this is a distinct possibility, especially with the imposition of ever tighter environmental controls over water and sanitation sources and facilities. It is reasonable to assume that most of this enhancement will come from the unincorporated areas in the center of the "E", which are surrounded by the City.

The adopted Future Land Use through the year 2005 is shown on Map F. The areas of greatest concern to this investigation are those along the beachfront. All shorefront proposed development is residential in character ranging from a density of 4 to 10 units per acre.

FUTURE LAND USE MAP — 2005 —



To the north and south of Atlantic Street, at the beach, there are three areas of residential use permitting up to 10 units per acre. The areas lying between are proposed for up to 8 residential units per acre. From just north of Jasmine Street south almost to Sadler Road 4 units per acre is the maximum development permitted. Travelling south there are three approximately equidistant stretches of 8 units per acre, 10 units and 4 units per acre to the southern City boundary.

Development along the shorefront is the area that will receive the brunt of a hurricane or northeaster along the coast. Therefore, it is anticipated that this is the portion of the City to be primarily investigated in this study.

Demographic Make-Up

Population

The population of the City increased by 1,541 persons during the 1980s from 7,224 in 1980 to 8,765 in 1990; over a 21 percent increase. The University of Florida estimates the City's 1993 population at 9,177, another 412 persons added to the 1990 census. During the 1980s, the City's population increased at an annual average of 154 persons; so far during the 1990s the annual average increase is approximately 137 persons. Included in the total population are group quarters (nursing home, etc.) persons; in 1980 the number was 149 and 211 persons in 1990.

Year	Total Population	% of County Pop	Annual Pop Increase
1970	6955	33.7	
1980	7224	21.9	Avg. 26.9
1990	8765	19.9	Avg. 154.1
1991	8906	19.8	141
1992	9089	19.9	183
1993	9177	19.76	88

Age of Population

As indicated by the following table, during the 1980s persons in the City aged 65 and over had the largest increase of 65.4 percent, followed by the age 21 to 44 age group with an increase of 37.6 percent. The age 5 to 20 age group increased by only 28 persons or 1.6 percent. Persons aged 65 and over increased by 517 persons and of the 1,308 persons aged 65 years and over, 553 (over 42 %) were aged 75 years and over; 135 were aged 85 years and over.

Year	Under 5	POPULATION BY AGE GROUPINGS			
		5 - 20	21 - 44	45 - 64	65 and over
1980	468	1915	2356	1694	791
1990	544	1943	3242	1868	1308

Ethnic Groupings

The ethnic population of the City has changed little during the past 20 years with the predominantly white population increasing its ratio to the total population to 76.5 percent by 1990. According to the 1990 Census, 110 persons of Hispanic origin resided in the City.

Year	White		African American		Other	
	Total	Pct.	Total	Pct.	Total	Pct.
1970	4869	70.0	2086	30.0	0	0.0
1980	5158	71.4	2054	28.4	12	0.2
1990	6706	76.5	1975	22.5	84	1.0

Language Spoken

Of the City's 8,221 persons aged 5 years and over, 386 speak a language other than English and 131 of those do not speak English well. Approximately 190 persons speak Spanish (45 do not speak English well); and 53 speak an Asian or Pacific Island language (33 do not speak English well).

Mobility Limitations

Of the City's 5,479 civilian non-institutionalized persons aged 16 years and over, 515 reported a mobility or self-care limitation in the 1990 census. Also, 352 households in the City reportedly had no vehicle; 215 of those were householders aged 65 years and over. Of the 3,503 total households in the City, 167 had no telephone; 22 of those were householders aged 65 years and over.

Education

Of the City's 2,067 persons enrolled in school in 1990, 1,410 were in pre-primary, elementary or high school and 548 were in college. Of the City's 5,935 persons aged 25 years and over, 556 (9.4%) had attained less than a ninth grade education. Of the 2,623 persons who had attended high school, 1,869 (71%) graduated. Of the 2,756 persons who attended college, 1,218 received associates or bachelor degrees and 467 had attained graduate or professional degrees.

Labor Force and Employment

In 1990, the census reported 4,367 persons in the City were in the civilian labor force; this was 62.4 percent of all persons aged 16 years and over. Military employment accounted for 102 of the employed persons in the City and the overall unemployment rate for the City was 4.5 percent compared to a reported 6.2 percent for all of Nassau County in 1990.

The predominant occupation in the City in 1990 was in the retail trade industry (752, 18%), followed by manufacturing (686, 16.4%), and personal services (386, 9%).

Private wage and salary workers accounted for over 76 percent of the City's workers. Government workers number 689 with 47 percent in local government, 27 percent in state government and 25 percent in federal government employment. Self-employed workers numbered 277 and unpaid family workers accounted for 29 employees.

Housing

While the population increased by 21 percent during the 1980s, the number of housing units increased by over 33 percent, indicating a smaller average household size. According to the census counts of 1980 and 1990, the number of seasonal units increased from 90 to 422.

Year	Total Housing Units	Occupied	Seasonal	Average Household Size
1970	2579	2119	54	
1980	3356	2794	90	2.58
1990	4477	3503	422	2.50

Based on building permit reports as provided to University of Florida by the City, over 591 residential building permits were issued during the years 1991 through October 1993.

The number of mobile homes in the City has fluctuated from only 10 in 1970 to 90 in 1980 and 64 in 1990. Owner households account for almost 65 percent of the City's occupied units (78.5% in the County); and 61 percent of all units are detached single family-type units. The median value of owner-occupied units in the City was \$69,400 in 1990 compared to \$72,600 for all of Nassau County.

VULNERABILITY ANALYSIS

Vulnerability to Wind and Water

Hurricanes and winter storms (northeasters) are the two major short-term natural events creating hazards affecting people (and their housing) who live on or near the beachfront or other waterfront property in Fernandina Beach. These storms attack low-lying portions of the barrier island system with storm surge overwash and flooding causing major sand movements, as well as wind damage.

Other natural processes, more especially, gradual increases in the sea level and continuing erosion cause growing exposure to natural hazards events. These shorefront dynamics create inherent and growing risk factors for our coastal areas and Amelia Island.

The relative storm hazard potential of a barrier island environment has been extensively studied by the Duke University Department of Geology, Program for the Study of Developed Shorelines, using the South Atlantic Coastal Zone Sea Islands, or barrier islands, as a study site.

In the course of their research they have developed the following rating system to represent the potential hazard expected for each type of barrier island terrain and condition.

LOW HAZARD:

- i. Mainland Forest (high elevation)
- ii. Maritime Forest (high elevation)

MODERATE HAZARD:

- i. Maritime Shrub Thicket (high elevation)
- ii. Vegetated Interior Dunes (high elevation)
- iii. Active Dune Fields (high elevation)
- iv. Vegetated Interior Dunes (varying elevation)
- v. Dune Swales and Blowouts

HIGH TO EXTREME HAZARD:

- i. Overwash Apron (low elevation, no forest)
- ii. Washover Fans (low elevation, no forest)
- iii. Frontal Dunes
- iv. Ocean Beaches

EXEMPT/DANGEROUS:

- i. Salt Marsh
- ii. Tidal Flats
- iii. Lagoon/Subtidal Nearshore
- iv. Inlet Migration or Expansion Zones
- v. Ocean/Subtidal Nearshore

The major categories of Coastal Zone Environment used in the hazard rating system are described or defined in the following terms.

Low Hazard: Well forested areas of high elevation, generally not subject to flooding or wind hazard. Considered "safe" sites for development; caution, removing portion of forest reduces protection and may degrade newly exposed forest from salt spray.

Moderate Hazard: High elevation areas not covered by maritime forest or dense shrub thicket, generally not subject to flooding or direct wave attack. Wind damage is the major hazard due to openness and exposure.

High Hazard: Lower elevation areas which contain dense maritime forest and/or shrub thicket, generally are potential flooding zones from storm surge waters and heavy rains. Lessened likelihood of wind damage or oceanfront erosion.

Extreme Hazard: Lowest elevation areas with little vegetation except low beach or dune grasses and no forest or thicket present, generally likely to be flooded from storm surge and heavy rains. They are most commonly ocean front areas which are likely to be overwashed during storms.

Exempt/Dangerous: Tidal or underwater areas that are subject to flooding daily or are dangerous due to erosion or shorefront movement and should be off limits to development; generally they are environmentally sensitive and are state or federal lands protected from development. Included are the National Seashore, state and national parks and similar preserves.

The City of Fernandina Beach was rated for environmental hazard potential in this study. The results of this study identify only two comparatively small areas of low hazard shown. Most of the area of the old city is considered to offer a moderate hazard for damage from a hurricane. North of Atlantic Street the majority of the City is identified as an area of extreme hazard potential. The coastal area south of Atlantic Street is identified as extreme to high potential for hurricane damage.

Fernandina Beach Vulnerability

In this instance, the affected coastal areas include almost all of the City of Fernandina Beach. A Category 5 storm would inundate almost the entire city, with the exception of part of the old portion of the City and the high area east of the airport. A Category 3 storm, which is a more or less average hurricane, will flood some areas on the seaward shore of Fort Clinch State Park and the Egans Creek wetland/marsh area.

Hurricane or storm winds are another serious hazard. Sustained winds used as a standard for building design in the City of Fernandina Beach are about 95 miles per hour (mph) in intensity. Actually, wind gusts may be 125 mph or higher. As was seen in Hurricane Andrew, the destructive power of the wind can be more devastating than that of the storm surge or flooding.

Many factors affect the action of a storm on an area.

- a. Velocity and storm surge area flooding is delineated on the FEMA Flood Hazard Maps, and in the "Storm Surge Atlas for Northeast Florida", Plate 2-1, Nassau County-Coastal Categories 1-3 Hurricane Impacts and

Plate 2-2, Nassau County-Coastal Categories 4,5 Hurricane Impacts, which cover storms in categories 1 through 3 and categories 4 and 5 respectively.

- b. Risk of storm damage decreases as the distance between the developed area and the ocean or sound is increased.
- c. Topographic relief in the form of an extensive dune system will protect the community from the brunt of a storm; however, where dunes have been flattened or built upon the natural protection is greatly lessened.
- d. Dense vegetation retained on site will reduce wind effects and prevent storm surge ebb scouring.

Other long-term factors must also be considered.

- a. Over time the erosion or build-up of sand and the beach or dune system will either wipe out existing housing or create new buffers to storm effects. A house may be at low risk to any single storm, but have its base and protection erode away. Conversely, beach build-up can create new dunes and buildable lots between the future oceanfront and existing shorefront housing.
- b. The relationship or curve of the shoreline to the ocean is an important factor in determining the impact of a storm. A shoreline that curves in will sustain less damage than one which juts out such as a cape.
- c. Flat wide roads perpendicular to the ocean front serve to act as channels allowing ocean waves to surge, fan out and penetrate inland.

Coastal High Hazard Area (CHHA)

The Coastal High Hazard Area definition that will be used for the City of Fernandina Beach in this study is that which is to be found in Chapter 9J-5.003 (14) of the Florida Administrative Code.

- (14) "Coastal high hazard areas" (also "high-hazard coastal areas") means the evacuation zone for a category 1 hurricane as established in the Regional Hurricane Evacuation Study applicable to the local government.

This definition was utilized based on the requirement of the contract scope of work and through consultation with the Division of Emergency Management at the Department of Community Affairs.

Lands in the City of Fernandina Beach that are included in a category 1 hurricane CHHA are those flooded by a storm surge of about 4.6 feet along the ocean frontage and about 4.0 feet along the Intracoastal Waterway. Flooding or a storm surge to this depth will have minimal effect on the island and its inhabitants. The velocity zones along the oceanfront, which are depicted on Map G, are capable of repelling a flood and surge of this depth without significant water damage to or flooding in the community.

On the Intracoastal Waterway the predicted depth of four feet will flood the marshes, but will not seriously impact any of the present development. Several industrial and dock areas on the Amelia River (Intracoastal Water-

TRAFFIC EVACUATION ZONES AND HURRICANE VULNERABILITY MAP

LEGEND

— EVACUATION ZONE 1 BOUNDARY

— EVACUATION ZONE 2 BOUNDARY

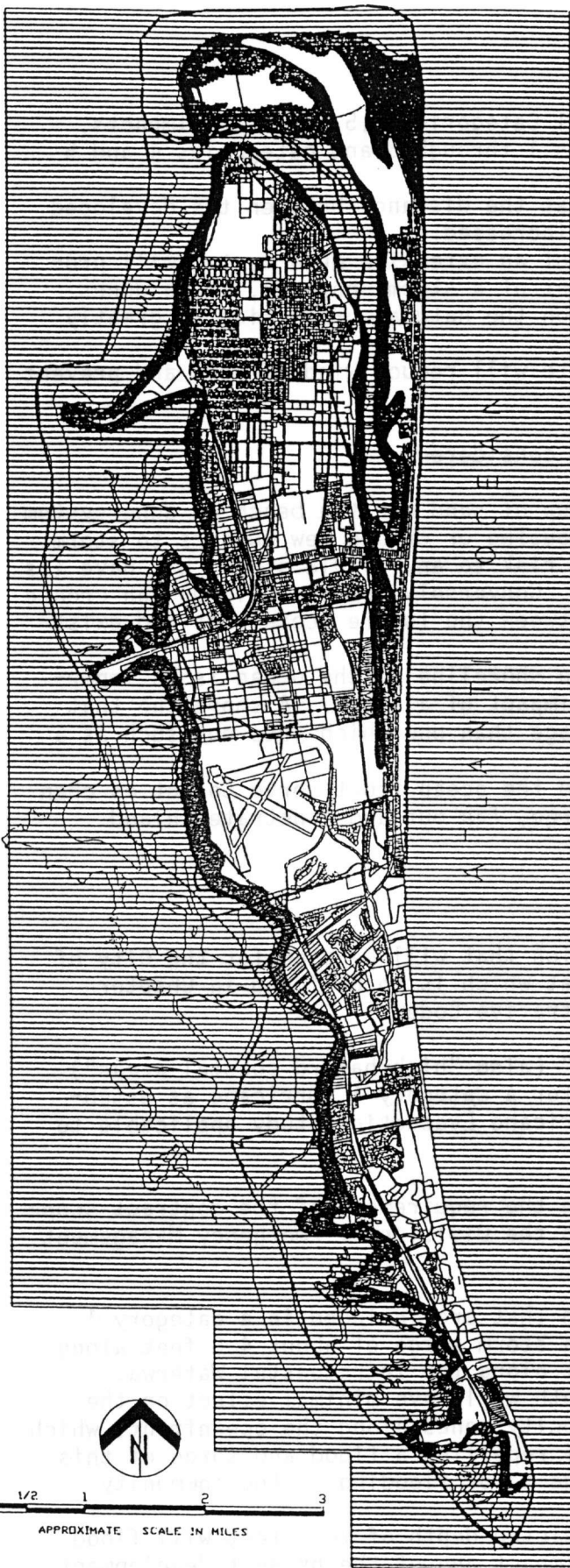
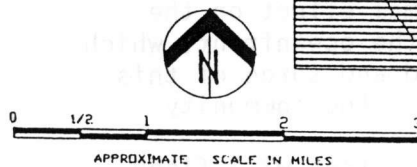
MAXIMUM EXPECTED AREA OF INUNDATION
BY HURRICANE CATEGORY.

— CATEGORY 1

— CATEGORY 2

--- MUNICIPAL BOUNDARY

SOURCE: TRANSPORTATION ANALYSIS UPDATE
NORTHEAST FLORIDA HURRICANE
EVACUATION STUDY
DECEMBER 1989



AMELIA ISLAND NASSAU COUNTY FLORIDA

PREPARED BY:
NORTHEAST FLORIDA
REGIONAL PLANNING COUNCIL

way) may experience flooding but this rise is not enough to seriously impact them.

However, if the Coastal High Hazard Area (CHHA) is also predicated on the evacuation zone which includes wind effects it would encompass all of Amelia Island. For the purposes of this study the CHHA will be based on a category 1 hurricane flooding or storm surge impact with concurrence of the Division of Emergency Management of the Department of Community Affairs.

b. Type of Land Use

Land uses in the CHHA of the City, consisting of the velocity zone of the ocean shorefront and wetlands along the Amelia River and Egans Creek are sparse. Development on the ocean shorefront is primarily just inland from the CHHA and consists of a mix of permanent and seasonal residential land use behind or in the first major dune off the beach. Such housing units are 100 to 200 feet back from the beach and are primarily a mix of old and new single family homes.

Along the Amelia River to the west of the City and on Egans Creek near the outlet there are scattered docks and marinas serving commercial shrimper/fishing boats, oceangoing cargo ships and barges, commercial excursion, and recreational pleasure craft. This combination of industrial and commercial facilities would be affected by flooding in a Category 1 Storm, however any damage should be minor.

c. Intensity and Density of Development

Present development along the shorefront is mainly single family housing units at a fairly low density. There are two condominium complexes at Atlantic Street and south of Sadler Road with a density of about 10 units per acre. North of Atlantic Street are two other high density areas though not as yet developed.

The comprehensive plan Future Land Map 1990 - 2005, portrays three densities of housing along the ocean front; they are 0-4 units per acre, 0-8 units and 0-10 units. These densities are grouped along the shore with about 50 percent of the frontage in 0-4 unit per acre density, approximately 30 percent of the shore in a density of up to 8 units per acre and the other 20 percent available for a density of 10 units per acre. Such high densities along the beachfront increases the possibility of damage and injury during a storm event.

d. Current Development Patterns

The patterns of development now being pursued in the City of Fernandina Beach are an expansion of present development density and intensity through infill in the existing road and property lot pattern. This pattern is vulnerable to storm surge and flood damage, in that, the streets are set at right angles to the ocean and offer a channel for storm surge to flow into and through the community. Also, many houses are being developed without thought being given to the effects of high winds and water.

Though the City has recently adopted a 110 mile per hour wind load for design purposes, as well as, standards for hurricane resistant residential design there is still the possibility of flooding and storm surge damage. Therefore, areas that are at risk during a category three hurricane should be reexamined for mitigation techniques and further restrictions on building.

Anticipated Development Patterns

As previously stated, development patterns are fairly well set for the city. Almost all future development will consist of infilling and strengthening present land use patterns. This will result in new single family residential housing in the most vulnerable areas of the city. New commercial development will not be as open for storm damage because most of it will be in the older part of the city or in the area to its south which is higher and further inland, and therefore not as susceptible to damage.

Current Condition of Infrastructure

The infrastructure for the City of Fernandina Beach is generally not vulnerable to storm damage except for shorefront roads such as Fletcher Avenue and the beachfront park at the foot of Atlantic Avenue. Other infrastructure is further inland and not likely to be damaged in an average storm.

Anticipated Infrastructure Additions/Upgrades/Repairs

The most important mitigation and repair would be to realign streets so they will not act to channelize floodwaters into the island. In order to accomplish this it is important to review access to private property and turn or eliminate streets that are in an improper alignment. In the event that this is not possible, it would be proper to consider constructing a sand dune or other seawall at the end of those streets which are perpendicular to the beach to reduce storm surge and flooding effects.

Percentage of Total Population Located in the CHHA

The CHHA is based on a category 1 storm. There would be no population within the flooding area of a Category 1 storm. However, if there is a category 3 storm, an average hurricane, some significant damage could occur. Population in the eastern shorefront areas would be evacuated and about 1,500 people would be affected. This is approximately 16.5 percent of the estimated Fernandina Beach population of 9,089 persons reported by B.E.B.R. as of April 1, 1992.

Percentage of Total Development Located in the CHHA.

As stated above, there is no development found in the path or flood area that would be affected by a category 1 hurricane.

Potential Problems and High Damage Areas

Storm surge from a hurricane event could, in concert with wind-driven rains and long-shore currents, destroy a number of buildings along the shoreline bordering on Fletcher Avenue. Development along Fletcher Avenue, which

runs parallel to the shoreline, consists of a number of single-family dwelling units and condominiums which could be destroyed or severely damaged in a major storm event. Storms surge and tidal action from previous storms have caused extensive alterations to the shoreline, resulting in two roadways east of Fletcher Avenue which are platted on land which is now underwater.

The general evacuation route from Fernandina Beach is S.R. 200, which connects Amelia Island with mainland Nassau County and provides access to I-95. Storm surge and rainfall will inundate low-lying roads preventing vehicular traffic from entering or evacuating Fernandina Beach, including portions of S.R. 200. The Storm Surge Atlas for Northeast Florida, developed using computer calculated storm surge estimates from the SLOSH model shows that Amelia Island will be "cut off" from the inland area by flooding from a Category 1 hurricane. The SLOSH model also shows that over a mile of S.R. 200 where the Thomas Shave Bridge traverses the Intracoastal Waterway will be within the area of inundation in a Category 2 storm. Of particular concern to Fernandina Beach is the ability to effectively evacuate residents safely with ample lead time, recognizing the potential for an extended period of inundation of the evacuation routes. The only alternative roadway from the island which could be used for evacuation is S.R. 105, which will be inundated in a Category 1 storm and is not considered a primary evacuation route for Fernandina Beach residents. A Category 5 storm will very nearly totally inundate the island; timely evacuation for Fernandina Beach residents is critical.

Wind damage from any hurricane above a Category 1 would be considerable in Fernandina Beach. The 1990 Census documents the year structures were built in Fernandina Beach as follows:

1989 to March 1990	224
1985 to 1988	535
1980 to 1984	619
1970 to 1979	938
1960 to 1969	550
1950 to 1959	644
1940 to 1949	453
1939 or earlier	514

The Fernandina Beach Building Code, as adopted in 1977 and amended in 1985, incorporates the wind pressure requirements from the Southern Building Code. It is questionable whether buildings within Fernandina Beach could withstand winds with speeds of greater than 100 mph (Category 2 or greater) in areas outside of the coastal building zone. As was seen from Hurricane Andrew, a large amount of destruction will occur from building debris. Within the coastal building zone, structures are required to withstand winds of up to 110 mph. Given the age of the housing stock, there may be some question as to the ability of the older buildings to withstand a Category 2 or above hurricane.

Features which could contribute to hurricane damage.

The primary dune system in northern Fernandina Beach, the area north of S.R. 200 and south of Fort Clinch State Park, is characterized by narrow,

low, sparsely vegetated dunes. These dunes for the most part do not exceed 1.5 meters in height and have been created by the piling up of sand by artificial means. Residential structures are located on the dunes in this area which has resulted in the removal of dune vegetation for construction. Numerous breaches in the dune system exist in this northern area many of which are low lying roads which run perpendicular to the shore. South of S.R. 200 (Atlantic Ave.) the dune system is somewhat better developed reaching elevations of approximately 2-3 meters in many places. This is a natural dune area vegetated with dune grasses. Breaches of the dune system exist in this area, although not as extensive as to the north. Structures are located further inland in this area, however, still within the dune area.

Community attitudes toward hazard mitigation

The hurricane season of June through October is a peak tourist time for Nassau County, due to the influx of tourists to Amelia Island Plantation and the county's beautiful unmolested beaches. Nassau County has been spared from being struck by a large number of storms, due to geography and predominant steering currents. According to the Florida Hazard Analysis, Nassau County has been struck by six tropical storms and one hurricane between 1886 to 1970. Hurricane David brushed the coast near Fernandina Beach in 1979, but did little damage. Due to this low incidence of hurricanes, most Nassau County residents have not been involved in a major storm. This "false sense of security" may have been shattered somewhat by Hurricane Andrew and the resultant devastating damage done in South Florida, as covered by the news cameras and in print.

Community attitudes and perceptions can be difficult to ascertain, however, absent a time-consuming and costly comprehensive survey eliciting community opinions on actions to be taken in the aftermath of a hurricane. Collective community attitudes are embodied in the goals, objectives, and policies incorporated in the City's Comprehensive Plan and the programs implementing these policies adopted in the Land Development Regulations.

Local officials have indicated their belief that the objective and policies adopted in the City's Comprehensive Plan adequately addresses hurricane protection and mitigation. Both elected and appointed City officials state that the land development regulations that the City has adopted are more than adequate to implement these policies. There are a few reasons for this belief that the City has done a more than adequate job at addressing hurricane mitigation. First and foremost, is the opposition of government, including the City of Fernandina Beach, from interfering with the ability of private property owners to utilize their property the way they desire. This results in a strong resentment for additional regulations and/or higher taxes for any reason, including hurricane mitigation. The second reason for the City's belief that they have done an adequate job regarding hurricane mitigation is a result of the fact that Fernandina Beach and Nassau County has not been involved in a major storm event. This has resulted in a reduce awareness of the need and extant of measures for hurricane mitigation. Objectives in the Fernandina Beach plan and the corresponding policies which directly or indirectly apply to hurricane mitigation are as follows:

OBJECTIVE 1.02 - Coordinate greater compatibility between the land development process and natural environment by directing development densities and intensities to those area having the most capability for absorbing development while protecting those environmentally sensitive areas which have lower tolerance for urbanization.

OBJECTIVE 1.06 - The City of Fernandina Beach shall coordinate with Nassau County in the safe evacuation of coastal population in accordance with Nassau County's Hurricane Evacuation Plan.

OBJECTIVE 5a.02 - By 1993, the City shall implement a beach and dune management program to assure the protection, conservation and enhancement of the remaining coastal barrier dunes and beaches.

OBJECTIVE 5a.03 - Reduce excessive hurricane evacuation times where they currently exist, and maintain all other evacuation times within the acceptable standard.

OBJECTIVE 5a.07 - To assure, through the development and subsequent adoption of the Land Development Regulations, that development in the Coastal High Hazard Area does not jeopardize human life and welfare.

OBJECTIVE 5a.08 - To prudently regulate development in the coastal zone so as not to subsidize development which is in a high hazard area and prepare post-disaster plans in an effort to reduce or eliminate the exposure of human life and property to natural hazards.

OBJECTIVE 7.01 - Planning activities projected in the comprehensive plan for Fernandina Beach shall be coordinated through interlocal agreements with the comprehensive plans for Nassau County, Nassau County School Board and all other public or private agencies which provide service in and around the corporate limits.

OBJECTIVE 8.02 - Public expenditures that subsidize development in high hazard coastal areas will be limited to those improvements required to ensure public health, welfare, safety; required to maintain, replace, or improve existing public facilities at their existing Level of Service; or that provides access to recreation areas.

Current standards, regulations, and ordinances that address or affect hazard mitigation in Fernandina Beach.

Regulations and ordinances adopted by the City of Fernandina Beach that address or affect hazard mitigation are the Land Development Regulations which support policies corresponding to the above listed Objectives from the Comprehensive Plan. Fernandina Beach is presently in the process of adopting Land Development Regulations, with final adoption anticipated in February.

Fernandina Beach Ordinance Number 794, Floodplain Management Policy, was adopted on May 4, 1988. Ordinance 794 requires that, within all land designated in the 100-year floodplain, all new construction or substantial improvements to existing structures shall have the lowest floor elevated to or above the applicable level of the 100-year flood.

Policy 1.06.03 of the Comprehensive Plan obligates Fernandina Beach to work directly with Nassau County Emergency Services staff in updating the County's Hurricane Evacuation Plan and disaster preparedness plan. Continued cooperation between the City and the County will be important in the event of a peacetime disaster situation. The Nassau County Emergency Operations Center will act as the direction and control facility during major disasters.

Is enforcement/compliance and hazard mitigation working in the City of Fernandina Beach? Why/Why Not.

To the extent envisioned by the City in adopting the Comprehensive Plan polices and Land Development Regulations, enforcement/compliance may be said to be working. However, the extent of the enforcement/compliance strategies adopted by the City may be limited by the infrequent number of major storm events in this area of the State. Public awareness and education programs regarding hurricane hazards, safety procedures and established evacuation routes are an important facet of hazard mitigation. Continued education of City officials and City residents as to the potential devastating impacts of a Category 2 or higher hurricane is important in achieving the hazard mitigation and limiting loss of property and life in the event of a major storm. By adhering to the Floodplain Management Policy and Coastal Construction Code and working with the County and the NEFRPC in addressing the question of hurricane mitigation, the City can continue to ensure that enforcement/compliance and hazard mitigation is effective.

In the Future Land Use Map of the Comprehensive Plan, high density residential development is prohibited. Policy 5a.07.04 states that "The City, through the Land Development Regulations shall prohibit any additional medium or high-density residential development in the Coastal High Hazard Area." Limiting density of development in the Coastal High Hazard areas will limit the amount of wind and storm surge damage in the event of a hurricane.

Chapter 158.120 and Chapter 158.121 of the draft proposed Land Development Regulations for Fernandina Beach regulate development activity within the shoreline activity zone. Excavation and destruction of native vegetation within the shoreline activity zone are strictly limited, in order to avoid interference with the normal transport of dune sediments and the natural protection afforded by natural beach dunes and dune systems.

It may be premature to assess the effectiveness of the City's enforcement/compliance and hazard mitigation. Perhaps the best method by which to assess the City's hazard mitigation efforts is by measuring the effectiveness in adopting regulations and actions taken in meeting the requirements of the above listed objectives and their corresponding policies addressing

hurricane mitigation. The City has adopted a number of Land Development Regulations which address hazard mitigation. The City recognizes that enforcement/compliance and hazard mitigation is an on-going process and its actual effectiveness is measured after a major disaster occurs. The following policies recognize this:

Policy 1.06.03 - Work directly with the county in updating its hurricane evacuation plan and disaster preparedness plan every five years and also re-evaluate its effectiveness immediately after a major disaster event to recommend appropriate improvements.

Policy 5a.03.03 - After a major disaster event, the City shall re-evaluate its effectiveness immediately thereafter and recommend appropriate improvements.

The need for addressing hurricane mitigation and the need for post-disaster redevelopment policies have been recognized by the City in adopting the Comprehensive Plan under Objective 5a.08. Policy 5a.08.02 mandates the need for programs to be developed to mitigate the destructive forces of hurricanes within the City's coastal zone, and establishes criteria for implementation of the policy. Policy 5a.08.03 states that the City shall adopt post-disaster redevelopment policies for addressing repair and clean-up, as well as removal, relocation or structural modification of structures and infrastructure damaged in the event of a hurricane. The County should continue to work toward developing Land Development Regulations effecting the policies set forth under Objective 5a.08.

The biggest hurdle facing the City in enforcement/compliance and hazard mitigation is the constraints in funding adequate number of positions with the City to have adequate staffing to address the myriad of rules and regulation needed to address post-disaster recovery. The City addresses this in part through continuous cooperation with Nassau County in meeting the provisions incorporated in the Nassau County Peacetime Emergency Plan.

City ordinances, regulations, etc. that restrict and/or control development in "hazard" areas (CHHA, etc.)

Fernandina Beach Ordinance 718, as amended by Ordinance 722 and Ordinance 733 in December, 1986, (City Code Chapter 151: Coastal Construction Code) adheres to the requirements of 1986 Coastal Zone Protection Act by providing for minimum standards for the design and construction of buildings and structures to reduce the harmful effects of hurricanes and other natural disasters occurring along the coastal areas of the city which front the Atlantic Ocean. The standards are intended to specifically address design features which affect the structural stability of the beach, dunes, and topography of adjacent properties.

City Code Chapter 153 (Floodplain Regulations) mandates the requirement of first floor elevations being above the level of the 100-year floodplain, as well as other building regulations to minimize flood damage. The Floodplain Regulations are embodied in Ordinance 794, which was adopted in 1988 in furtherance of the national flood program.

PRE & POST MITIGATION TECHNIQUES

LAND USE

The measure which a local government may utilize to mitigate hurricane impacts usually will require the government to obtain a certain control over the uses of land within the hazard susceptible areas. Sometimes this can be accomplished by such techniques as zoning and regulation. A local government may also develop certain types of ownership rights, which may include mechanisms as fee simple purchase or leaseback agreements. The following is a discussion of some techniques which are or could be utilized by the City of Fernandina Beach to strengthen hurricane mitigation.

Zoning

The use of zoning as a tool for hurricane mitigation is to ensure that irresponsible development in coastal high hazard areas is minimized or eliminated. Zoning can be used to control density and type of development, and maybe relatively inexpensive when compared with other mitigation measures such as fee simple acquisition. Zoning in coastal areas requires special consideration because of large pressures for developing these areas.

One zoning option in coastal areas is to designate high hazard areas as an open space or conservation area and thereby prohibiting future development. The potential problem with these designations is in the "taking" of private property rights unless there exists a reasonable economic use for the property.

Incentive or Bonus Zoning

One alternative to conventional zoning is to provide developers incentives or bonuses for projects which incorporate hazard reduction features. Increased densities or floor space is given in exchange for some public benefit from the developer. This method can be used for establishing beach access, dune walkovers, and open space for such hazard mitigation purposes as the protection of dune lines. Utilization of this method must clearly establish the public benefit to be gained and private incentives in the zoning ordinance. Incentive or bonus zoning can be counter productive to other hazard mitigation strategies by encouraging or permitting higher densities in coastal high hazard areas, and therefore must be used with care.

Overlay Zones

An overlay zone is a flexible zoning category which floats over a community and can be put into place when and where circumstances arise to make it necessary. A hurricane hitting the community could trigger the initiation of a floating or overlay zone. The overlay zone would identify regulations for density, height, setbacks, etc. which would come into place when circumstances dictate they are needed. This type of zoning regulation is usually implemented for a interim period while the community works out needed revisions to the zoning ordinance. The benefit of this type of zone is that it

can allow a local government the opportunity to test if a zoning ordinance would be effective by using an interim floating zone. The interim floating zone could be worked out in advance and utilized after a hurricane in place of a temporary moratorium over building.

SUBDIVISION REGULATIONS

Subdivision requirements refer to the way land is divided up for development. They can be utilized to control the density, configuration and layout, and also establish requirements and standards for public improvements. There are several concepts which can be employed to mitigate hurricane impacts, however, some concepts are not a realistic alternative for the City of Fernandina Beach.

Planned Unit Development

This technique would place regulations on an entire area rather than individual lots. The benefit of this mechanism is that it offers flexible approaches to hazard mitigation, such as clustering and education of open space. Project design under a PUD can enhance hazard reduction by allowing deviation from normal zoning and subdivision requirements when a developer's plans incorporate features such as vegetative buffers and setbacks from dune and dune vegetation, which will increase protection from major storm events. The difficulty in utilizing this approach in Fernandina Beach is the limited amount of large tracts of undeveloped land or land under a single ownership in the coastal area which would normally be needed to implement PUD.

Clustering of Development

Clustering is a mechanism which will not affect the overall density permitted on a particular piece of property, but would seek to concentrate the higher density of development on portions of the property which is less vulnerable or has less adverse impacts on a resource. In a coastal community, such as Fernandina Beach, clustering can be utilized to locate structures further landward or on a higher part of a site making the structure less susceptible to flooding. This can also be a mechanism to aid in protecting active dune systems and vegetation, by clustering the structures away from the dune system and from dune vegetation.

ACQUISITION

Probably the surest strategy for preventing recurring losses from hurricane damage is thru the acquisition of areas where such damage has occurred or is anticipated to occur. This strategy has the advantage of addressing a number of concerns and other goals of the City of Fernandina Beach. These other goals which could also benefit from this particular strategy include the stated objective of protection and conservation of remaining coastal barrier dunes and provide an increase public beach access. Acquisition of areas susceptible to storm damage will also aid in maintaining natural processes such as vegetation and dune development in the CHHA, and address the issue of private property rights a concern in Fernandina Beach.

Presently neither the City of Fernandina Beach nor the State of Florida has an acquisition program specifically directed toward post disaster acquisition. Section 1362 of the National Flood Insurance Act empowers the Federal Insurance Administration to purchase insured property which has been damaged by a storm event and then transferring the land as open space to the State or local government. The eligibility requirements are strict and the funds are limited. The City has in existence an acquisition program for oceanfront or near oceanfront lands for the primary purchase of beach recreation.

Fee Simple Acquisition

This is the outright purchase of the property title. This is the simplest acquisition strategy to perform (given funding is available), however, it can also be the most expensive form of acquisition.

A local government can purchase property at market value or below market value. Land purchase by a local government at or below market value is usually donated or sold at a reduced rate for tax purposes. Acquisition programs which rely on purchasing land for below market value are strongly dependent on community good will and support.

The advantage of this mechanism is that it provides local government with the greatest degree of control over the use of the land. The disadvantage of fee-simple acquisition is almost prohibitive cost of coastal property. Another problem with fee simple acquisition is the loss of potential tax revenue to the local government by the removal of the land from the tax rolls.

One of the mechanisms available to a local government is to acquire property thru its power of eminent domain. The power of eminent domain guarantees the right of the local government to purchase property in the interest of the public as long as the owner of the land is justly compensated. The problem with use of eminent domain to acquire land is that it can lead to resentment and opposition which can hinder other acquisition programs which highly depend on the good will of the community and other potential sellers.

Leaseback

This technique can be used to encourage and control development on undeveloped tracts of land. In the leaseback arrangement the local government purchases a tract of property and then leases all of it or only a portion of it back for private development. Commercial entities which have suffered severe damage and financial loss could sell the property with a guarantee from the local government to lease the property at a low rate. This would benefit a business that has suffered financial hardship from the storm by providing a mechanism to obtain lost capital through the sale of the land.

This could also be a benefit to the local government by keeping business in the local government. This has the potential to provide a business the ability to stay within the local government and not having to relocate to another local government or not rebuild at all. Local government could also gain a greater control over the property by imposing restrictions or

conditions on the lease. The lease back technique allows the local government to recover some of the costs of acquisition by leasing the property for development or redevelopment.

Conservation Easements

Easements allow the purchaser to obtain certain rights to a certain piece of land without actually purchasing title to the property. Conservation easements normally include items such as setbacks, building codes etc. Easements have been utilized to protect environmentally critical or natural areas. Easements have also been utilized for beach access.

DUNE PROTECTION AND ENHANCEMENT

Dunelands are the areas of dunes, sand ridges and troughs which are situated between the beach and uplands. Specifically dunelands are bounded at their seaward edge by the upper line of the beach at the annual high tide mark and extend landward as far as the land is subject to active gain or loss of sand because of the sea or wind. Construction on dunes is desired to gain a seashore ambience.

Dunes should be considered fragile, dynamic systems. An established well stabilized dune can reduce the damage evoked by a major storm and can offer almost complete protection from minor storms. Dunes will provide some protection against storm waves and surge for structures located behind them. However the primary function of is to hold and replenish sand that is eroded by wave action either through normal erosion process or in catastrophic manner as happens in a hurricanes. In this way dunes foster long term stability of the shorefront by retarding beach recession.

Dunes need to be protected so that they continue to buffer the source of storm waves and surges and store and yield sand to protect beaches and shorelands.

The primary dune system in northern Fernandina beach the are north of S.R. 200 and south of Fort Clinch State Park is characterized by narrow, low, sparsely vegetated dunes. These dunes for the most part do not exceed 1.5 meters in height and have been created by the piling up of sand by artificial means. Numerous breaches in the dune system exist in this northern area many of which are low lying roads which run perpendicular to the shore.

South of S.R. 200 the dune system somewhat better developed reaching elevations of approximately 2-3 meters in many places. This is a natural dune area vegetated with dune grasses. Breaches of the dune system exist in this area, although not as extensive as to the north.

Once natural processes or human actions destroy or seriously damage individual dunes or a dune system a program for restoration or stabilization of the dune area should be considered by the local government. Revegetation programs and structures such as snow fences are effective and often times inexpensive methods for communities, individuals or groups to restore dune systems.

Permanent development should be placed inland of the active dune system. The goal should be to place all new development is placed landward of the active dune ridges. A local government, however, must be aware of the issues associated with "taking" and will not be able to disallow any use to a parcel of beach front land unless they are willing to purchase that property. This may require the adjustments of construction set backs or the placement of additional construction requirements depending on the particular circumstances. Where beaches are receding, such as the case in Fernandina Beach, it is important to predict the position of the shoreline some time into the future to set an appropriate setback distances.

Dunes have often leveled through grading and/or excavation in the course of development activities leaving the areas behind the dunes unprotected. Because the total sand storage capacity of dune systems is a vital component of dune system and beach stability, the removal of sand from this area is unacceptable.

The protection of dune vegetation which catches sand and binds dunes together is mandatory for maintaining and improving the functional condition of a dune system. Dune vegetation is uniquely adapted to withstand the rigors of wind, sand and salt. However, this vegetation is highly susceptible to impacts from human feet, vehicles, or grazing animals. Even slight alterations to a dune or displacement of vegetation can result in a blow out through erosion by wind or water leading to significant dune loss. One mechanism for protecting dunes vegetation from foot traffic is through the use of elevated boardwalks.

Because dune systems offer the most aesthetically pleasing view of the ocean and convenient access to the beach it is often the location for residential development. This is the case in many locations in Fernandina Beach. Development in these locations often forecloses the protective values of the dunes, not only for the owners but also for neighboring property owners.

To ensure that structures are properly located a local government could adopt mechanisms which prohibit construction on active dune areas or prohibit the alteration of active dunes when a site is being prepared for development. This can be completed through the development of performance standards that do not permit alteration of dune structure or function. Strict adherence to federal flood insurance standards for elevating the first floor of structures will often address the issue of building on top of a dune. In those instances where the configuration of parcels of land does not permit a reasonable set back, a local government could adopt tight performance standards so that design and construction of structures will not result in the loss of the function and protective nature of the dune system.

Management for protection of active dunes is a primary objective which should be considered as a measure for minimizing the impact of major coastal storms. This means minimizing the disturbance dune vegetation on the dune sand system. Public access must be considered when dune management. The ability for the public to traverse the dune areas to access the beach area must be provided and controlled in a way that will prevent damage to dune vegetation.

HAZARD DISCLOSURE AND EDUCATION

Hazard Disclosure Statements in Real Estate Transactions

A more enlightened and informed citizenry and/or consumer will have the ability to make a more rational decision when it comes to implementing hazard mitigation techniques. This can not only lead to implementation of certain techniques by private property owners to provide additional protection to their own structures, but also can lead to the support for the incorporation by additional mitigation techniques through local government regulations and through the demand for the incorporation of mitigation measures based upon marketing decisions.

Real Estate Disclosure Statements

The potential for damage to structures in Fernandina Beach from a major storm event is well documented. Storm surge, wind, and flooding can cause major, and in some cases irreparable, damage to structures within the CHHA. Hazard disclosure statements in real estate sales transactions will serve the purpose of heightening community awareness of hurricane risks and actions needed to reduce the potential for damage. The upfront dissemination of information on hazard potential in lease agreements and sales transactions would ensure that new homeowners and business merchants are given the opportunity to weigh the benefit of purchase versus the potential for storm damage. This enlightenment allows the buyer to make market decisions on factors which may not be apparent, particularly in an area of the State which has not experienced a major storm event, but which has the potential to be severely impacted depending upon any future storm's path and strength.

Disclosure should convey real and accurate information on the potential impacts resulting from hurricane damage, and the steps to be taken in the event of a major storm event. It is recommended that a brochure be published for use by the real estate market showing a map of the CHHA, potential damage, and steps to be taken in the event of a hurricane. While allowing for a more open market decision by prospective buyers, hazard disclosure also allows for education of Fernandina Beach citizens on hurricane mitigation.

The requirement for hazard disclosure statements in sales transactions can be expected to be met with stiff resistance from the real estate community. State legislation could require real estate agents to disclose this information upfront, mandating that buyers in all parts of the State be given the same level of information. Implementation by the local government would be difficult, given the resistance of real estate agents and developers. An incentive program for voluntary disclosure of potential disclosures may be needed to lessen opposition and promote disclosure.

Awareness/Education Programs

A community awareness program can be developed which will address a couple of target audiences. The first part of the program can be designed to target prospective and new residents. This can take the form of brochures

and other material which educate this audience on things to look for when purchasing a new home in hazard areas, such as elevation and flood proofing of structures. This part of the program can also provide information to new residents on the areas within the City that are susceptible to hazard damage and the type of damage that may affect structures in these areas of the City.

The dissemination of information to existing residents can provide the knowledge necessary to allow them to undertake actions which will promote the soundness of their structure against major storms, or other techniques which can be initiated which will reduce the likelihood of property damage. An education program can explain the protective aspects of a sound, well established and stabilized dune. This can include the value of enhancing and restoring dunes, and the importance of protecting dune vegetation.

The use of public participation in the development of a post-hurricane plan can also play an important role in educating the public. Technical information can be disseminated to citizens involved in the planning process. This information is then available for utilization in the planning process and also can be adapted on an individual basis. More important than providing opportunities to educate the public, participation in the planning process develops a feeling of ownership over mitigation measures which are developed in a post hurricane mitigation plan. This feeling of ownership can provide support for officials attempting to implement measures which may not be controversial within the community.

ALTERNATIVE PLANS

The present realities within the City of Fernandina Beach, and the community attitudes toward hazard mitigation and private property rights, sets a situation where the adoption and implementation of additional more restrictive regulations related to hurricane mitigation are not very likely, especially, if it is perceived that these regulations will adversely effect the rights a private property owners. Probably the most effective way to increase hazard mitigation and protection would be through the use of incentives for private property owners to incorporate hazard mitigation techniques.

The City of Fernandina Beach should reassess its comprehensive plan and land development regulations to provide incentives for private property owners to incorporate and implement hazard mitigation techniques. Probably the most reasonable mechanism would be for the City to adopt Bonus or Incentive Program within its land development regulations. This would allow individual property owners to increase the development density of their property in turn for providing or implementing certain hazard reduction measures. The City can use this mechanisms to secure protection of dune vegetation by allowing increased residential density if a property owner will also construct a dune walkover which protects dune vegetation from the structures to the beach area. Additional densities will provide the economic benefit that will out way the cost of constructing a dune walkover. The City could investigate the opportunities to allow land owners to increase the floor area of buildings if they construct their structures behind the dune line, thereby providing protection of the primary dune line.

It will be important for the City to identify those mechanism which they believe will be the most beneficial and desirable and build those into the bonus zoning mechanism. It is important that the City give consideration to hurricane evacuation when adopting a density bonus program. It would be counter productive for the City to allow densities to increase to a point that would increase evacuation times.

The density bonus program can be combined with an overlay zone for the coastal areas that are the most susceptible to adverse impacts of a category 1 & 2 hurricane. The practicality of tying to density bonus program to the overlay zoning is that it can be removed after a hurricane strikes. This will allow the City to assess whether the measures that where implemented through the density bonus program where actually adequate at providing the protection anticipated. If it becomes clear that other hazard reduction measures would have been more practical and provided more protection they could be amended into the program before the overlay-bonus program is reinstituted.

If a successful transferable development rights program could be implemented within the City, the density bonuses could be sold to property owners outside of the hurricane vulnerable areas. This type of program could allow for the implementation of hazard reducing measures, while also limit-

ing the amount of development in the coastal areas. Because of the lack of undeveloped land and the limit size of Fernandina Beach, it is not believe that a successfully TDR program can be implemented there. Therefore, the discussion of this option is limited.

ALTERNATIVE MITIGATION PLANS

The present realities within the City of Fernandina Beach, and the community attitudes toward hazard mitigation and private property rights, sets a situation where the adoption and implementation of additional more restrictive regulations related to hurricane mitigation are not very likely, especially, if it is perceived that these regulations will adversely effect the rights a private property owners. Probably the most effective way to increase hazard mitigation and protection would be through the use of incentives for private property owners to incorporate hazard mitigation techniques. These alternative mitigation plans are based on the mitigation strategy techniques discussed in the previous section of this report.

The City of Fernandina Beach should reassess its comprehensive plan and land development regulations to provide incentives for private property owners to incorporate and implement hazard mitigation techniques. Probably the most reasonable mechanism would be for the City to adopt Bonus or Incentive Program within its land development regulations. This would allow individual property owners to increase the development density of their property in turn for providing or implementing certain hazard reduction measures. The City can use this mechanisms to secure protection of dune vegetation by allowing increased residential density if a property owner will also construct a dune walkover which protects dune vegetation from the structures to the beach area. Additional densities will provide the economic benefit that will out way the cost of constructing a dune walkover. The City could investigate the opportunities to allow land owners to increase the floor area of buildings if they construct their structures behind the dune line, thereby providing protection of the primary dune line.

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undeveloped land and the limit size of Fernandina Beach, it is not believe that a successfully TDR program can be implemented there. Therefore, the discussion of this option is limited.

The City of Fernandina Beach has established a Beach Property Acquisition and Development Trust Funds to facilitate and expedite the acquisition and development of oceanfront and near oceanfront land. All moneys and revenue from the operation, management, sale, lease, or other disposition of land, related resources, and facilities acquired or constructed under this program shall be deposited into this fund.

Therefore, the City of Fernandina Beach has a mechanism in place to utilized a number of these financing options to acquire property which is susceptible to hurricane damage. However, presently the use of this Trust Fund for the purchase of property is restricted. Section 151.43 of the City's Coastal Construction Code states that all land purchase by funds from this program shall be for the prime purpose of beach recreation. To allow the City more flexibility for the use of these funds and to provide another mechanism for the acquisition of property in the CHHA, the City should consider expanding the purpose of the land purchase by thru program. The City of Fernandina Beach should be allowed to utilize Beach Property Acquisition and Development Trust Funds to purchase lands for the purpose of hazard protection.

As previously noted, the dune system in Fernandina Beach is not well established especially in the northern areas of the city where development exists adjacent to the beach. There are also many areas within Fernandina Beach wear driveways and roadways are laid perpendicular to the shore which encourages overwash and storm surge ebb. A comprehensive dune management and protection program could go along way to eventually providing some protection from the impacts of a hurricane on the City. As a mechanism for long term protection, in some cases dunes can be as effective as some sea walls.

Fernandina Beach should include two aspects to there dune protection plan. First, a program to increase the height and size, and fill in gaps of existing dunes, and second protection of existing dunes and dune vegetation.

In the northern portions of the City, the area where residential development is being constructed and in place south of Fort Clinch State Park, the dune system is small and unstable with sparse vegetation. In this area sand fencing should be utilized between the gaps in the dunes to begin the process of repairing the dune system. The sand fencing should be use in combination with a planting program. The dominate dune grass which exists on dunes in Fernandina Beach is Uniola paniculata, Sea Oats. Planting of sea oats should take place after the accumulation of sand from the sand fencing has started. The end of the sand fencing should be tied into the end of the neighboring dunes to allow the formation of a continuous dune system. the existing dune system should be supplemented with additional vegetation which will help stabilize and allow continued growth of the existing dunes.

Another important component to the dune enhancement program will be to address the areas where streets dead end into the beach. These streets are

lower in elevation than the surrounding dune areas all will encourage over wash and storm surge ebb. Overwash and storm surge channelled through these streets will increase damage to structures located behind the primary dunes and the first row of structures built parallel to the beach. These streets will also increase wind and water erosion of the dunes of which these streets pass through. Sand fencing should be placed at the location of the streets terminus with the sand. In these areas where streets terminate at the beach it may be necessary to begin the dune building process thru artificial means. This would require the use of machinery and the importation of sand to build an artificial dune. After the graded material has settled and been washed by irrigation or rainstorms, vegetation will need to be planted to stabilize the dune. These streets play an important role in providing public access to the beach in Fernandina Beach. Therefore, it is important to provide protection of the plantings from human traffic. Again the utilization of sand fencing can provide this protection, by placing the fencing so that it directs pedestrian traffic to desired areas, access to the beach can be maintained while minimizing damage to dunes and dune vegetation.

To maintain the beach access function that these streets serve and protect the dunes that are recommended to be developed at these points, the City should investigate the placement of dune walkovers at these streets. The inclusion of dune walkovers in the dune restoration program must be considered up front. The best for construction is prior to the planting of vegetation. Construction should be elevated to allow the accumulation of sand during dune buildup and the growth of vegetation underneath. The cost of walkover construction can be expensive, however there are state funding assistance programs available for this purpose as discussed in the funding section of this report.

In order for Fernandina Beach to prepare for reconstruction after a coastal storm event, an assessment of the local damages must be compiled. In preparation for addressing this requirement the City should identify those individuals that will participate on a Damage Assessment Team prior to a storm event. The Damage Assessment Team should be of broad based composition. It is recommended that this team be composed of elected officials, the City building official, The City Manager, Public Works Official, the City Police Chief and Fire Chief, and a representative of the Nassau County Emergency Management Office.

The City of Fernandina Beach Damage Assessment Team will be involved in three facets of the damage assessment. An initial inspection and assessment of damage immediately after the storm. This information will be utilized in determining whether an emergency declaration should be requested, and whether a local state of emergency should be declared. The second stage of assessment will include the development of assessment teams which would be responsible for assessing the different types of damage which exist within the City. The third stage would include coordinating and accompanying state and federal damage assessment teams in their appraisal of damage. This would also include assisting state officials in preparation of damage survey reports required for Federal disaster assistance.

The City of Fernandina Beach will find pressure placed on it to support immediate reconstruction activities. The City should develop, in advance

of a disaster, a set of reconstruction permitting procedures that will be strictly followed to effectively manage the timing and sequence of reconstruction. The procedures should expedite permitting for minor repairs and allow for the adequate review of permits for major repair.

An approach which may be beneficial to the City during the high pressure period immediately after a hurricane is the adoption of a temporary reconstruction moratoria. This will allow the time for the Damage Assessment Team to report back on its findings and for the City to consider appropriate opportunities for mitigation before these opportunities are lost to redevelopment. This should only be temporary mechanism as the name implies. A time limit on this moratoria should be identified and held to.

The City has began a program to educate local businesses on measures that they can take to prepare and mitigate the impacts of a disaster such as a hurricane. This program involves the local emergency management officials, such as the fire and police chiefs, along with the chamber of commerce meeting on a regular basis with local business to educate and disseminate mitigation strategies for local businesses. The city should continue and expand this program.

The City is working towards expanding this education program to the local citizenry of the City. This would also include regular meetings and hopefully local media exposure to disseminate information to the citizenry of Fernandina Beach.

PRE MITIGATION AND POST-HURRICANE RECONSTRUCTION PLAN

The City of Fernandina Beach's adopted comprehensive plan contains many objectives and policies that when implemented will provide some mitigation for the adverse impacts of a hurricane. The present political realities within the City of Fernandina Beach, and the community attitudes toward hazard mitigation and their support for private property rights, sets a situation where the adoption and implementation of additional more restrictive regulations related to hurricane mitigation are not very likely.

The mitigation criteria presented in this plan was developed with consideration given to the communities attitudes towards hazard mitigation. It is believed that the most effective way to increase hazard mitigation and protection would be through the use of incentives for private property owners to incorporate hazard mitigation techniques. The mitigation/post hurricane reconstruction plan is designed so that it can fit into the goals, objectives, and policy format of the local government comprehensive plan.

The City of Fernandina Beach should actively coordinate implementation of mitigation/post hurricane reconstruction measures and strategies with the Nassau County Emergency Management Office. Implementation of these measures on Amelia Island will only be effective with the active cooperation of Nassau County. The Director of Emergency Management acts as a liaison between the County Commission and state agencies, and should also be a liaison between City Council and County Commission, as well as City Council and the State. Mitigation/post hurricane measures and strategies should not be inconsistent with the Nassau County peacetime emergency plan.

Implementation of any proposed mitigation/post hurricane reconstruction measures and strategies may be problematic, and will not be effected unless a concerted effort is made in packaging these measures and strategies in an effective way. The following outlines the procedures which will be necessary in implementing the hazard mitigation measures. The following suggestions are designed to further the existing polices already in place in the City's Plan.

RECONSTRUCTION AND BUILD BACK POLICY

Fernandina Beach shall adopt regulations that guide the build back policy and timing sequence for reconstruction after a hurricane.

Following a hurricane, the Fernandina Beach City Council will adopt a temporary building moratoria to allow sufficient time for immediate damage assessment, the identification of redevelopment opportunities, and hazard mitigation policy implementation.

**(What activities should fall under moratoria)

Emergency repairs to buildings or infrastructure that house the following activities or entities shall not be subject to the temporary moratorium, because of their necessity to protect the public health and

safety, provided that permanent repairs to these activities follow established development and redevelopment regulations.

- * Potable water facilities not located within the CHHA
- * Waste water facilities not located within the CHHA
- * Electrical power distribution lines
- * Emergency communication facilities
- * Emergency stabilization of road systems
- * Law enforcement, fire and medical facilities
- * Response/recovery centers and distribution centers
- * Debris removal activities, and
- * Stabilization or removal of structures about to collapse.

Emergency repair activities necessary to prevent injury, loss of life, imminent collapse or additional damage to the building or structure and its contents shall be allowed to be undertaken at anytime after a hurricane.

Examples of acceptable emergency repair activities include:

- Temporary roof repairs with plywood or plastic sheeting to make the structure habitable or to prevent continuing damage due to rain and/or wind to building interior or exterior.
- Covering exterior wall openings with plywood or plastic sheeting.
- Repairs to interior ceilings to make structure habitable.
- Temporary shoring measures to avoid imminent building or structure collapse.
- Repairs to steps.

Fernandina beach shall adopt land development regulations which implement a buildback policy after a hurricane which sets forth:

- Buildings or structures damaged up to 50% of the "fair market value" shall be rebuilt to original condition, with repair work subject to current building and life safety codes.
- Buildings or structures damaged greater than equal to or exceeding 50% of the "fair market value" the entire structure shall be rebuilt or otherwise required to be brought into conformance with the original square footage and density provided that they comply with the following:

"Fair Market Value" can be determined by utilizing the formula of: (Assessed value of structure x 120% = Fair Market Value). The structure's owner can opt to establish replacement value by hiring a state licensed contractor rather than utilizing a the Fair Market Value Formula.

- * Land use consistent with Future Land Use Element of the adopted Fernandina Beach Comprehensive Plan.
- * Federal Flood Insurance elevation requirements.
- * building codes for flood proofing
- * Repair work meets current building and life safety codes.
- * State Coastal Construction Control Line regulations.

The review of redevelopment permits for structures experiencing damage equal to or exceeding 50% of the fair market value shall be guided by the following redevelopment priorities:

- Encourage the relocation of structures experiencing major damage in the CHHA to outside the CHHA.
- All structures rebuilt within the HVZ will be required to be inspected prior to issuance of Certificate of Occupancy to ensure conformance with redevelopment and building code regulations.

Fernandina Beach shall adopt a post-disaster permitting system which will expedite permitting for minor repairs and assure the quality of of rebuilt or reconstructed buildings. This may require additional building inspectors being imported into the City after a disaster.

Provide public facilities and services which guarantee to the greatest extent possible the health safety and welfare of Fernandina Beach and which will not require the future expenditure of public funds or infrastructure in the coastal high hazard zone.

Based upon the inventory of damage and the definitions provided, the review of permits for relocation/repair, shall be guided by the following:

- Repair in place facilities which are essential to the immediate health safety, or welfare of citizens, or work to provide the impaired service to residents through alternative means.
- Public facilities destroyed or damaged in the CHHA shall be relocated outside the CHHA and rebuilt to current local, state and federal construction standards.

ACQUISITION PROGRAM

The City shall adopt priority criteria for relocating and acquiring damaged property

When determined to be in the public interest the City Council may enter into negotiation with a property owner for the purpose of transferring said property by sale, lease or donation to Fernandina Beach provided the following conditions are met:

- Property is located in an area damaged by the hurricane.
- Property is covered by wind and flood insurance policies at the time damage took place, and either;
 - + Building structures must have been damaged to the extent that the cost of reconstruction repair exceeds 50% of the Fair Market Value of the structure at the time of the hurricane, or
 - + The property has been abandoned by the owner that could cause urban blight as defined by state statute.

Property which is acquired by the City of Fernandina Beach under these criteria must be dedicated for such purposes as the City Council shall agree are consistent with:

- Open space purposes or otherwise furthers the City's Comprehensive Plan
- Managing the land for its dedicated purposes
- Not permitting any future uses which will create a threat to human life from Hurricane effects.

The City should amend Section 151.43 of the City's Coastal Construction Code to allow the utilization of Beach Property Acquisition and Development Trust Funds to purchase lands for the purpose of hazard protection.

INCENTIVE MEASURES

The City of Fernandina Beach should develop and adopt a density bonus program which will allow for increased residential densities in return for a landowner or developer incorporating and implementing certain hazard mitigation techniques.

Density bonuses will be given for the following dedications or actions:

- + dedication of land for public beach access
- + dedication of dune areas landward of the CCCL
- + the clustering of structures landward of and away from dune areas
- + where dune vegetation exists elevating structures to protect dune vegetation.
- + the inclusion of an elevated dune walkover from structure to beach area.

The density bonus system must be designed and take into consideration hurricane evacuation times. Hurricane evacuation time will be maintained and or reduced. The bonus system shall not be allowed to over tax infrastructure including the ability to safely evacuate not only Fernandina Beach but also Amelia Island.

The density bonus system shall be in the form of a overlay zone for that area of the City identified as the evacuation zone for a Category 1 and 2 hurricane as established in the Northeast Florida Regional Hurricane Evacuation Study.

The density bonus overlay zone shall be lifted after a hurricane. During the post-disaster recovery period the actions given credit for increased densities will be reviewed to assess whether these actions provided the protection and mitigation desired. Recommendations for changes to the density bonus overlay zone shall be made to the City Commission and appropriate amendments to this program shall be considered prior to re-enacting the bonus overlay zone.

DUNE ENHANCEMENT AND PROTECTION

The City's Comprehensive Plan presently contains Objective 5a.02 which states that "By 1993, the City shall implement a beach and dune management program to assure the protection, conservation and enhancement of the remaining coastal barrier dunes and beaches".

Policy 5a.02.03 of the City's Comprehensive Plan states that the city will adopt standards for dune stabilization and restoration projects by 1991.

The City shall adopt additional land development regulations for the protection and preservation of existing dune vegetation within the coastal building area of the City. This should include:

Measures which encourage dune areas lacking vegetation to be planted with native dune vegetation to enhance dune development and stabilization.

Where native dune vegetation exists, pilings, not fill, shall be used to elevate structures, so that protection of the vegetation is maintained.

As part of the standards to meet the City's policy for dune restoration projects the City shall develop a restoration program which will specifically target dune restoration and enhancement at the terminus of the streets that are perpendicular to the shore and dead end at the beach.

Survey of property adjacent to these streets to guarantee that access to privately owned lots is not prevented by the closing off of these streets. If the creation and enhancement of dunes at these street ends would remove access to private lots, are there other option for access that would allow access while not inhibiting the development and maintenance of dunes in these locations.

The use of dune walkovers to continue to provide access to the beaches at these locations. Design of the dune walkovers shall be done in a manner that will allow for the buildup and growth of the dune and dune vegetation.

Analysis of whether mechanical means including the need to import sand is required to speed the increase in elevation of these dunes to provide immediate protection from flooding and storm damage.

A survey of permits that will be required to undertake actions need to implement dune development at these sites.

Determine type of "fencing" that will be utilized to enhance accumulation of sand in location desired for dune development. The sand fencing can also be utilized to protect dune vegetation

and direct pedestrian traffic to areas that will minimize impacts to the planted areas.

Develop a planting program for the new dune areas. This should include:

- Type of vegetation to be planted
- Source of plants to be planted; transplant for local source, or from nursery.
- Post planting program, including: watering if needed, fertilization to enhance plant growth.

Development of a maintenance program for the new dune areas. The City of Fernandina Beach should give consideration to the construction of elevated dune walkovers at these street ends.

- These street ends serve as vehicle for beach access.
- Dune walkovers will maintain beach access in these areas.
- Elevated walkovers will allow for continued dune development and the growth of vegetation underneath.
- Walkovers should be constructed prior to planting of vegetation.

If the construction of dune walkovers is unacceptable because of cost, other mechanisms must be incorporated which will direct and minimized the extent of pedestrian traffic accessing the beach. This can include the use of fencing to prevent trampling of dune vegetation and directing foot traffic the certain access points.

The City should target gaps in the dune system where residential and commercial development has taken place adjacent to the beach areas for dune restoration.

REAL ESTATE DISCLOSURE STATEMENT

The City shall encourage that all real estate sales transactions contain hazard disclosure statements detailing the hazard potential in lease agreements.

Fernandina Beach will actively support the State of Florida Legislature in any efforts to adopt legislation requiring hazard disclosure statements in all real estate sales transactions.

In the event of adoption of hazard disclosure statement requirements by the State Legislature, Fernandina Beach will work with the real estate community to develop accurate hazard disclosure statements in sales transaction documents

AWARENESS/EDUCATION PROGRAM

Fernandina Beach shall establish a public awareness and education program to raise the level of awareness for residents and tourists about the potential damage, adequate preparation, and evacuation responsibilities in the event of a hurricane.

The City shall develop a brochure and other educational material which contains information on hurricanes, the areas of Fernandina Beach which are susceptible to flood and wind damage, and the steps to be taken in the event of hurricane, including pre-hurricane measures which would limit damage and facilitate adequate storm preparation.

Fernandina Beach shall establish an active citizens advisory committee on post-hurricane mitigation to participate in development of mitigation measures to be developed by the City.

The City of Fernandina Beach and its emergency management officials should continue to work with the local chamber of commerce to continue regular participation at chamber meeting or special workshops to educate local businesses preparing for the impacts of various disaster including hurricanes. This educational program should include pre-disaster preparedness, during disaster action, and post disaster recovery.

IMPLEMENTATION SCHEDULE

Schedule for implementation of dune development program:

Planting of dune vegetation in northeast Florida is optimal during February or March. Therefore, working backward from that date will allow for the development of an implementation plan for this program. The following program is taken from Dune Restoration And Revegetation Manual, Report Number 48 Florida Sea Grant College, September 1982. This indicates a year long schedule which should allow enough lead time and guidance for dealing with scheduling and problems which may arise.

- | | | |
|----------|--|---|
| Step 1: | Decision to restore dunes | |
| Step 2: | Determine and clarify responsibility for planning funding, public support. | As soon as decision to restore is made. |
| Step 3: | Develop funding plan. | Upon completion of Step 2. |
| Step 4: | Determine permits needed, begin applications | Six months before starting beach work. |
| Step 5: | Develop compliance plan for any permit requirements. | Continuing |
| Step 6: | Refine public support program and begin to implement, if component of restoration program. | As requires by plan |
| Step 7: | Review and update elements of plan in light of permits, data, funds, etc. | Minimum one month before planned beach work is began. |
| Step 8: | Schedule work, hire or secure volunteer commitments. Order plants, fencing, etc. | Upon conclusion of Step 7. |
| Step 9: | Begin beach work. Develop long range maintenance plan | Fall, early spring to catch sand moving in winter winds |
| Step 10: | Planting of vegetation and begin maintenance plan | Early spring |

Acquisition

The City has initiated an acquisition program of coastal property through attempts to obtain funding through the P-2000 program to purchase lands adjacent to the existing City Beach area at the end of Atlantic Avenue. The City has been unsuccessful to this point to acquire land through this program. The City should continue there acquisition program by identifying potential parcels of coastal lands that could be purchased through CARL,

Preservation 2000, or the City's Beach Property Acquisition and Development Trust Funds.

Comprehensive Plan Amendment Timeframe

The majority of the measures proposed for the City of Fernandina Beach would be implemented through amendments to the adopted City Comprehensive Plan. Amendments to the adopted City of Fernandina Beach Comprehensive Plan are governed by the process set forth in Section 163.3184, Florida Statutes. The following is an implementation strategy for the adoption of amendments to the City's Comprehensive Plan as they may relate to pre and post hurricane mitigation:

Development and refinement of new objectives and policies with appropriate supporting data and analysis.	4 months
Public hearing for Transmittal of amendment to Dept. of Community Affairs	
Regional and State Review of transmitted amendment	Maximum 90 days
Submittal of objections and recommendations by Department of Community Affairs to Fernandina Beach	
Adopt/adopt with changes or a determination not to adopt comprehensive plan amendment	Maximum 60 days
Transmit adopted amendment to Department of Community Affairs	Maximum 5 days
Determination of Compliance by Department of Community Affairs for the adopted amendment	Maximum 45 days

This schedule would be applicable if there are no problems associated with the proposed comprehensive plan amendment. Depending on when the Department of Community Affairs is requested to undertake the review of a proposed amendment, the above schedule can take longer than indicated. If the Department of Community Affairs determines that the adopted amendment is not in compliance negotiations to bring the amendment into compliance can be lengthened indefinitely.

FUNDING OPPORTUNITIES

Dune restoration projects depending on their size can require considerable labor and funding. Several types of local, county and state organizations, government and private, can be requested to provide funds and technical support for these activities. Where specific neighborhoods or housing tracts benefit, these organizations may provide funding for a private project. Where a single property owner will benefit, securing outside funding is likely to be more problematic.

private and public organizations usually use their purposes and goals as criteria in choosing projects to support. It is therefore helpful to be aware of these purposes, and to identify how a particular project will fulfill these purposes, when attempting to obtain funding from a community organization.

Individual property owners can organize cooperative neighborhood dune restoration projects, in which the individuals share cost and workloads to reach the desired goal of replacing a dune area.

The State of Florida, thru the Department of Environmental Protection the Beach Erosion Control Assistance Program. The purpose of this program is to assist local governments in alleviating serious sandy beach erosion problems and for the protection and preservation of sanding beach resources of the State. Specifically financial assistance thru this program can support; dune construction and revegetation activities beach dune walk-overs, dune protective walkways or other measures of dune protection or preservation, sand fencing, biological and hydrological monitoring, sand source studies or educational signs.

Since the majority of dune restoration projects will be nonfederal aid projects the sponsors of the project will be responsible for a minimum of 25 percent of the total contract costs and 100 percent of:

- a) All costs in excess of the contractual costs;
- b) The cost for project engineering, including engineering supervision and inspection;
- c) The cost of providing all required construction easements, rights-of-way, public access easements, and required vehicle parking spaces;
- d) The cost of obtaining all required permits;
- e) The cost of establishing erosion control lines; and
- f) All other costs.

The procedures and requirements to obtain funding thru this program are found in Section 16B-36, Florida Administrative Code.

Depending on the size, location, purpose and beneficiary of the dune restoration or revegetation project, the City Council may be able to provide support for a project. In addition to or instead of money, the City may be able to provide assistance thru the loan of equipment such as trucks, bulldozers or planting tools. In these cases, evidence of support by local

citizens, such as the donation of labor or money, can be a help convince a local government to cooperate.

Another possible option for funding of dune restoration projects is thru the establishment of Erosion Control Districts. Although this would take the cooperation of Nassau County, a district can collect an advalorem tax on non-exempt property within the district to pay for organizational and administrative costs. The use of Erosion Control Districts may be a mechanism for raising funds for beach restoration activities. Once established the district can negotiate with county or state agencies, and the Army Corps of Engineers.

Action Summary for Funding Support

- First Action - Check with U.S. Army Corp of Engineers
- Second Action - 1) Check with state agency responsible for beaches
2) Check with state agency responsible for coastal permits
- Third Action - Contact civic organizations dealing with environmental issues
- Fourth Action - Solicit neighborhood or beach area dwellers for support
- Fifth Action - Contact City Council or district officials.

Financing of Land Acquisition

There are numerous financing mechanisms available to the City of Fernandina Beach for the purchase of hurricane vulnerable properties both prior to and after a major storm event. Prior to a storm the most useful possibilities for funding acquisition of hazard area is through the exist CARL and P-2000 programs available though the State of Florida. After a storm event, the City will likely find that unique opportunities exist to purchase hazard prone properties. In the post storm instances the City needs to utilized Section 1362 of the National Flood Insurance Act to the greatest extent possible to acquire these lands. The City of Fernandina is a small town that does not have a large tax base. Therefore, consideration will need to be given to the impact on the tax base of acquiring these lands. This will be a concern of the City, and a balance will have to developed for the City to fully endorse land acquisition.

The following funding strategies are available and should be useful to the City of Fernandina Beach in implementing an acquisition program.

Instalment Purchasing

Chapter 125.031, Florida Statutes, allows counties to enter into agreements to purchase or lease purchase property needed for public purposes for periods not to exceed 30 years. This arrangement allows a county to purchase property from private individuals, other governmental agencies, or corporations. The agreement allows for a stipulated rental to be paid to a land owner over time from current or other legally available funds. When the terms of a lease of this type is for longer than 60 months, the rental shall be payable only from sources other than ad valorem taxation. A tax incentive can also be included to the seller in return for certain stipulations to go with the property.

The National Flood Insurance Program (NFIP)

Section 1362 of the National Flood Insurance Act empowers the Federal Insurance Administration to purchase insured property which has been damaged by a storm event and then transferring the land as open space to the State or local government. The eligibility requirements are strict and the funds are limited. There must be a structure of property which is located in a flood hazard and covered by a standard NFIP policy, and one of the following criteria must apply:

1. The structure must have been damaged beyond repair by flooding;
2. The structure must have incurred significant flood damage (average of 25 percent of structures value) on a minimum of three different occasions over the previous five years;
3. Local or state government regulations prohibit repair or restoration of property that has sustained damage from a single storm occurrence;
4. Local or state ordinances or regulations permit repair only at a significantly increased cost.

The property must also have some benefit to the flood insurance program. The owner must be willing to sell and the local government must be willing to accept ownership of the property. Because funds are limited and the criteria stringent, this program has limited application.

Preservation 2000 Program

The Preservation 2000 Program was set up by the State of Florida to provide funds for the acquisition of lands. Specifically the program is designed to allocate funds to the Florida Communities Trust through the Preservation 2000 Program to assist local governments the conservation, recreation, open space, and coastal elements of their local government comprehensive plan. This program provides land acquisition grants and loans for the purpose of natural resource conservation and outdoor recreation.

Conservation and Recreational Lands Program and Trust Fund

Funds from this program are utilized to purchase property which is considered to be environmentally sensitive, endangered and useful for recreational purposes. Local governments and individuals can propose areas for acquisition. Land purchased through this program can ultimately be achieve more than the primary purposes proposed for this program. This provides that opportunity for a local government to purchase land for recreational and environmental purposes and also provide for hazard mitigation.

Land and Water Conservation Funds

The Land and Water Conservation Fund program is 50/50 match program with the federal government and states. The program can be used for the purchase and development of recreational lands. Florida has had a policy to give priority for the purchase of beach areas through this program.

Local Acquisition Program

The City of Fernandina Beach has established a Beach Property Acquisition and Development Trust Funds to facilitate and expedite the acquisition and development of oceanfront and near oceanfront land. Section 151.43 of the City's Coastal Construction Code states that all land purchase by funds from this program shall be for the prime purpose of beach recreation. To allow the City more flexibility for the use of these funds and to provide another mechanism for the acquisition of property in the CHHA, the City should consider expanding the purpose of the land purchase by this program. The City of Fernandina Beach should also utilize Beach Property Acquisition and Development Trust Funds to purchase lands for the purpose of hazard protection.

LOCAL GOVERNMENT DECISIONS

Staff of the Northeast Florida Regional Planning Council met with the City of Fernandina Beach government officials and presented the results of this investigation on May 11, 1994. The presentation to the local officials highlighted the following findings from the pilot study:

- Dune Enhancement and Protection program
- Reconstruction and Buildback Policy
- Acquisition Programs
- Incentive Measures Tied to Land Use Mechanisms
- Information/Awareness Program
- Comprehensive Plan Amendments

Each of the recommendations were covered in detail for the local officials. This included the identification and presentation of possible changes to the City of Fernandina Beach Comprehensive Plan. This included the presentation of new objectives and policies to be included under the City's Goals. The presentation included proposals for new land development regulations to implement certain new comprehensive objectives and policies. Specifically a draft dune vegetation protection ordinance was provided for information, also an ordinance that would enact a temporary building moratorium after a hurricane was presented. No formal action was taken regarding either of these ordinances.

The local officials recognized the need and voiced a desire to look at pre planning in advance of a hurricane rather than concentrating on post disaster policies. In that respect the local officials were interested in the information awareness program. The Northeast Florida regional Planning Council staff was requested to participate in the seminar program that was being initiated by the Public Safety Committee of the Amelia Island, Fernandina Beach, Yulee, Chamber of Commerce. The purpose of the seminar program is inform business owners and employees on pre planning for the impacts of a hurricane as well as post disaster recovery. The concept is to educate through multiple seminars on issues such as county wide evacuation planning, available emergency services, and ensuring employee safety. This program will provide business owners with information on services related to financial and insurance institutions and contractors. The City of Fernandina Beach desires to expand this information/awareness program to public seminars and media presentations. Involvement of the NEFRPC was desired in this effort.

Overall the Fernandina Beach local officials were appreciative of the effort presented in the Pilot Study for Pre- and Post-Hurricane Mitigation for the City of Fernandina Beach, however, no formal actions were taken or are anticipated to be taken by the City regarding the mitigation measures presented in this study.

Discussions moved towards the need for increased coordination at the regional level to guarantee that should a disaster impact the region the smaller entities, such as, the City of Fernandina Beach receives adequate support and aid. The fear of the City is that they will be overshadowed by the

larger governmental entities like the City of Jacksonville when it comes to recovering aid. It was pointed out to the City officials that other efforts being undertaken by the NEFRPC outside of the realm of this work effort may address this concern. First, the NEFRPC will be developing a Strategic Regional Policy Plan (SRPP) for the region. One of the required elements of the SRPP is an Emergency Preparedness Element, this element can and will address this concern by the City. Council staff urged the City's participation in the development of this element and the other parts of the SRPP. The NEFRPC has also received notice that it is being funded to complete a feasibility analysis for the utilization of Cecil Field to a regional disaster distribution center. This would allow for a more organized and efficient distribution of needed resources to various parts of the region in the case of a disaster.

Staff of the NEFRPC committed to continue to work with the City of Fernandina Beach beyond the scope and requirements of this study to further any of the presented or other mitigation measures that the City may desire to investigate in the future.

APPENDIX A

DRAFT ORDINANCE FOR TEMPORARY BUILDING MORATORIUM

ORDINANCE NUMBER 94-_____
AN ORDINANCE PROVIDING PROCEDURES AND GUIDELINES
FOR: A TEMPORARY BUILDING MORATORIUM RESTRICTING
POST-STORM RECONSTRUCTION INCLUDING: INTENT,
APPLICABILITY, DECLARATION, DURATION, TASK FORCE,
PERMITTED ACTIVITIES, PENALTIES, AND PROVIDING
FOR SEVERABILITY AND AN EFFECTIVE DATE.

Section 1. Short Title.

This ordinance may be known and cited as the City of FERNANDINA BEACH POST-STORM TEMPORARY BUILDING MORATORIUM.

Section 2. Finding of Fact.

WHEREAS, the City of Fernandina Beach is a coastal community and subject to the destructive forces of hurricanes, storms, and other natural hazards; and,

WHEREAS, the City Commission finds that careful planning is necessary to ensure a level and pattern of post-storm reconstruction which will not unreasonably endanger life and property; and,

WHEREAS, the post-disaster reconstruction period offers an opportunity to implement comprehensive preplanned reconstruction measures such as the Fernandina Beach Hazard Mitigation Plan; and,

WHEREAS, the confusion, community anxiety and instant desire to rebuild that is a typical aftermath of a disaster can impede these efforts; and,

WHEREAS, a temporary moratorium on post-storm building reconstruction or other land development activities, which is limited in duration, will offer an opportunity to assess damage, coordinate relief efforts, and evaluate and promote reconstruction in conformity with the Fernandina Beach Hazard Mitigation Plan;; and,

WHEREAS, the City Commission of the City of Fernandina Beach, Florida held public hearings on _____, and accepted comment, made revisions and found the Ordinance to be consistent with the intent of the City of Fernandina Beach Comprehensive Plan 2001.

NOW THEREFORE BE IT ORDAINED by the City Commission of the City of Fernandina Beach, Florida as follows:

Section 3. Declaration of Intent and Purpose.

the intent and purpose of this Ordinance is to provide for an opportunity to properly assess the damage situation, coordinate relief efforts of state and federal agencies, and evaluate and promote reconstruction in an orderly and timely fashion, and in conformity with the Fernandina Beach Hazard Mitigation and Comprehensive Plans.

Section 4. Applicability.

Any development, redevelopment, reconstruction, new construction, or other land activity, which requires a building permit or other development order within the City's jurisdiction shall be subject to this Ordinance, except as may be exempted by other section(s) of this Ordinance.

Section 5. Declaration and Duration.

The Temporary Post-Storm Reconstruction Moratorium shall be declared by the Mayor upon the occurrence of one or more of the following events affecting the City of Fernandina Beach.

1. The City is struck by a hurricane force equal or greater than 3 on the Saffir-Simpson Scale, as determined by the National Weather Service; or,
2. the City is declared a disaster area either by the Governor of Florida or the President of the United States; or,
3. as determined by the City Building Inspector, twenty (20) percent or more of the structures in the City are destroyed or substantially damaged by a hurricane or other coastal storm hazard; or,
4. upon action by the City Commission, a part of the City of Fernandina Beach determined to meet the above criteria may be delineated and declared under the regulation of the moratorium.

As the head of the Reconstruction Task Force, the Mayor shall declare the Temporary Post-Storm Reconstruction Moratorium and it shall remain in effect for a period of not less than thirty (30) nor more than ninety (90) days, and may be revoked earlier in accordance with other provisions of this Ordinance.

Section 6. Creation of Reconstruction Task Force.

The City of Fernandina Beach Post-Storm Reconstruction Task Force shall be activated concomitant with the Temporary Moratorium by the Mayor with the approval of the City Commission. The Task Force membership shall consist of those persons specified in the Hazard Mitigation Plan, and others as may be appointed by the Mayor and City Commission.

Section 7. Task Force Responsibilities

The Reconstruction Task Force shall immediately survey all affected areas and prepare a report, dividing the delineated area into the following three categories:

1. Undamaged or Slightly Damaged Areas: Areas in which buildings, structures, or other improvements have been damaged up to 25 percent of their assessed market value, as determined by the Building Inspector and/or Tax Assessor;
2. Damaged Areas: Areas in which buildings, structures, or other improvements have been damaged to an extent greater than 25 percent but less than 50 percent of their assessed market value, as determined by the Building Inspector and/or Tax Assessor;
3. Severely Damaged Areas: Areas in which buildings, structures, or other improvements have been damaged to an extent of 50 percent or greater of their assessed market value, as determined by the Building Inspector and/or Tax Assessor;

The Task Force shall recommend, by damage category, any changes it deems necessary to the zoning, subdivision regulations, setbacks, density, or elevation regulations, or to any other ordinances which it deems necessary or advisable to prevent a recurrence of coastal hazard damage.

The Task Force shall also identify any parcels or locations suitable for acquisition by the City or by the City in conjunction with state or federal agencies or non-profit conservation organizations.

Section 8. Proscribed and Permitted Activities

During the period the moratorium is in effect no building permits, development permits, other land development activity permits or variances of any kind will be issued, and no construction or reconstruction activity may be undertaken, except by the express order of the Reconstruction Task Force, or as stated in the following exceptions:

- a. minor interior repairs; or,
- b. emergency repairs necessary to prevent injury or loss of life; or,
- c. emergency repairs necessary to prevent imminent collapse or other substantial damage to existing structures from wind and weather.

If any pre-storm non-conforming use or activity is destroyed by the storm or by man's post-storm activities, it shall not be resumed except in conformity with the provisions of this ordinance.

SECTION 9. Enforcement and Penalties

This Ordinance shall be enforced by the Planning and Building Department of the City of Fernandina Beach. Such enforcement mechanisms shall include

stop work orders or injunctions and recovery of cost, expert fees, and attorney fees.

Penalties for violation of this Ordinance shall be assessed by the City Commission. A fine not to exceed \$200.00 for each day the violation continues and up to \$500.00 per day for repeat violation incidents may be determined as appropriate by the Commission.

SECTION 10. Severability

Should any section, subsection, sentence, clause, phrase or portion of this Ordinance be held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and shall not affect the validity of the remaining portion.

SECTION 11. Effective date

This Ordinance shall take effect and be in force from and after the date of its adoption by the City Commission.

PASSED ON THE FIRST READING, _____, 1994.

PASSED AND ADOPTED ON THE SECOND AND FINAL READING, _____, 1994.

Mayor

Commissioner

Commissioner

Commissioner

Commissioner

CERTIFICATION

I, _____, FERNANDINA BEACH CITY MANAGER, DO HEREBY CERTIFY THAT THE ORDINANCE ATTACHED HERETO IS A TRUE AND CORRECT COPY OF ORDINANCE _____-94 ADOPTED BY THE CITY COMMISSION OF FERNANDINA BEACH, FLORIDA ON _____, 1994.

REFERENCES

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